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ADDRESSES AND ORIGINAL ARTICLES

THE HEART SOUNDS IN NORMAL AND PATHOLOGICAL CONDITIONS *

BY E. BRAUN-MENENDEZ, M.D.

DIRECTOR OF CIRCULATORY INVESTIGATIONS, INSTITUTE OF PHYSIOLOGY, IN THE FACULTY OF MEDICAL SCIENCES, BUENOS AIRES

MY purpose is to expound the results of some of the investigations on the heart sounds carried out in the Institute of Physiology of Buenos Aires (director, Prof. B. A. Houssay) and the Institute of Physiology of Cordoba (Argentine) (director, Prof. O. Orias) by Prof. Orias and myself and a number of active colleagues (Battro, Caeiro, Cossio, Pereira, Segura, Solari, Taquini, and others). But first I wish to review some fundamental physical and physiological facts and discuss the principles and practice of phonocardiography.

METHODS

The principal characteristics of the heart sounds are the great irregularity, low intensity, and low frequency of their constituent vibrations. The heart sounds are only just above the threshold of audibility.

As is well known, the ear is much more sensitive to relatively high frequencies and the threshold of frequency is roughly between 16 and 16,000 vibrations per second. The limits of frequency and intensity are, however, not the same for all, and the auditory appreciation of slow vibrations of low frequency and low intensity lasting only for brief moments can be cultivated by practice and training.

The limited capacity of the ear to inform us about the heart sounds, their duration and their time relations, made it necessary to devise some means of recording them graphically, thus permitting a more objective and quantitative analysis. The general principles of these methods is this: the sound vibrations, instead of acting on the tympanic membrane, act upon an appropriate resonator, the movements of which may be directly recorded; or indirectly through the modifications produced in an electric circuit. In both methods, direct and indirect, the phenomenon recorded is the vibration of a resonator, and on the fidelity of this resonator depends the efficiency of the method employed.

The direct method which we have used was originally devised by Frank (1904) (who made a thorough mathematical and experimental study of optical registration) and then modified by Wiggers and Dean (1917b). It is based on the principle of optical registration with Frank's segment capsule. The membrane covering the Frank's capsule acts as a resonator and its movements are directly recorded by means of a beam of light on a photosensitive surface (Wiggers 1937).

The indirect methods also have a resonator which forms part of the microphone, a part which when excited by the heart sounds enters into mechanical vibrations. These mechanical vibrations produce modifications of an electrical circuit and, conveniently amplified, act upon a loud-speaker or a sound-recording system or an oscillograph of any kind. The possibility of amplifying to a great degree the electrical variations, of eliminating at will any group of sound frequencies by means of the so-called frequency filters, and of employing recording devices of high fidelity, seems at first sight to put the indirect methods on a more accurate basis than the direct methods for the registration of the heart sounds.

Registration of these sounds entails, however, great difficulties that have not yet been completely overcome. Not only are the heart sounds of very low intensity and composed of vibrations of very low frequency, but they are accompanied by various extraneous noises of nearly the same frequency and intensity: respiratory sounds, sounds of muscular contraction, and sounds due to friction of the receiver with the skin or hairs of the chest wall. And, apart from these noises of low intensity, the microphone causes a hiss of its own and is also excited by impacts of relatively high energy—i.e., the apex-beat. The ear, with its great analytical power can eliminate these as parasitical, but the apparatus has not this psychological aptitude. That is why the electrical variations that are heard in a loud-speaker as a fairly good reproduction of the heart sounds make very poor graphic representations.

The greatest problem encountered in recording heart sounds is the exclusion of these extraneous noises and the apex-beat. Most electrical devices solve this by eliminating all frequencies below 40 or even 50 per second. They thus obtain good-looking records, but they have eliminated a great number of the vibrations of the heart sounds. I hope that by a careful analysis of all the factors involved the electrical methods will in the future solve all these problems.

The principal requisites of a good recording device (Orias and Braun-Menendez 1937) are:—

1. Maximum sensitivity—i.e., lowest threshold for intensity and frequency.
2. High natural frequency of the resonator and in the electrical devices also of the oscillograph.
3. Fidelity in the reproduction of amplitudes.
4. Appropriate damping.
5. The possibility of obtaining together with the heart-sound record other curves allowing the individualisation and timing of the different groups of vibrations.

When I refer to the heart sounds I shall take the expression in its widest sense, to include all the vibratory manifestations integrating the phenomenon, even if some do not fall within our auditory field. This observation is the more relevant because my exposition is based upon records obtained by procedures able to pick up vibrations that may escape auditory perception. And this, I may say, seems to me an advantage over other methods. Firstly, because from a scientific point of view it is interesting to know all the manifestations of any phenomenon and not only those that fall within the perception of one of our senses, in this case the ear. Secondly, because the establishment of a definite limit between that which is audible and that which is not must be admitted as a pedagogic resource to show that such distinction exists, but it is necessary to realise that the thresholds of intensity and frequency are not the same in all individuals, and that they may improve considerably with exercise and education.

As I have already mentioned, for the correct interpretation of the graphic records of the heart sounds it is of the utmost importance to obtain simultaneously a record of some other cardiac event. The jugular pulse optically recorded is the best tracing for this purpose because it furnishes the only means to recognise in human beings the different diastolic phases. In some instances it may be desirable to record, besides the venous pulse, the electro-

* Lecture given on May 3rd at University College, London.

cardiogram. This tracing gives, however, no indication about either the occurrence or duration of the diastolic events. In some instances the simultaneous registration of the central arterial pulse (carotid or subclavian) or the apex-beat may be useful. The venous pulse, however, enables us to establish the duration and the time relations of nearly all the phases of the cardiac cycle. Since the "c" wave represents practically the beginning of the ejection period and the vibrations due to the closure of the aortic sigmoid valves are easily seen in any good record, the duration of the ejection period may be determined. From this notch to the apex of the "v" wave the isometric relaxation period extends. The apex of the "v" wave represents the opening of the auriculo-ventricular valves and its descending limb the rapid ventricular filling phase.

The Four Sounds

Though some writers maintain that Galen had a knowledge of the heart sounds the first record that I know is that of Harvey. In his "Anatomical Dissertation Upon the Movement of the Heart and Blood in Animals" (chap. V) he writes: "... with each movement of the heart, when there is the delivery of a quantity of blood from the veins to the arteries, a pulse takes place, and can be heard within the chest."

It is really astonishing that the medical profession had not before paid attention to the heart sounds, but it is even more interesting to know that their existence was denied emphatically by a contemporary of Harvey. Parisanus in his "Nobiles Excertationes" commenting upon Harvey's description of the heart sounds, said this: "Nor we, poor deafs, nor any other doctor in Venice can hear them. But happy may be he who hears them in London." These words are really, as Daremberg says, a "shameful testimony of human stupidity."

But it was not till nearly two centuries afterwards, when Laennec discovered the stethoscope, that the heart sounds were precisely described. Much work was then done to establish the cause of these acoustic manifestations of the heart's activity. The first serious effort to determine the cause of the heart sounds by experiments was made in England by the committees appointed by the British Association for the Advancement of Science. The graphic methods have marked an important step in our knowledge of their number, characteristics, and time relations, and in this field the pioneer work of Hürthle, Einthoven, and Geluk and Frank must be mentioned.

But in spite of all the work that has been done the majority of medical men and students are aware of the existence of only two normal sounds and with this idea in mind proceed to the auscultation of normal and pathological subjects. Possibly, then, some of my listeners will be surprised when I remind them that there are *four normal heart sounds*. Apart from the first sound at the beginning of systole, and the second sound at the end of ventricular systole, there is a third, so-called physiological third heart sound in early diastole and an auricular sound in presystole just before the first sound. These last two are, of course, not so important as the first and second sounds, but they are constantly produced by the heart, and are frequently recorded and not seldom heard by auscultation. It may be less surprising, perhaps, to learn that both the auricular and the third heart sounds were discovered by auscultation and both by Englishmen. The auricular sound was first mentioned by Clendinning in 1840, and the physiological third sound was discovered by Gibson in 1907.

THE FIRST SOUND

The first sound of the heart is heard by auscultation in all normal subjects and is described as prolonged and dull. Its cause is complex, multiple factors contributing to its formation: the contraction of the ventricular muscle, the sudden closure and tension of the A-V valves, and the sudden extension of the walls of the ventricles are certainly the principal factors. But our records show that in very many normal cases the first sound is composed of two principal groups of vibrations (each of them having two components) and that the first of them corresponds to the isometric contraction phase, while the second corresponds to the ejection period (Braun-Menendez and Orias 1934). This appears to us to mean that vibrations of vascular origin caused by the ejection of blood from the ventricles contribute to the formation of the first heart sound. Its duration varies between 0·10 and 0·17 sec., and so does the number of vibrations. The beginning of the first sound precedes the "c" wave of the venous pulse by 0·04 to 0·06 sec., and coincides approximately with the spike of the R wave of the electrocardiogram. The frequency of its constituent vibrations falls between 13 and 1000, but in the majority of cases most of them fall between 24 and 45 per second.

THE SECOND SOUND

The second sound, of higher pitch, abrupt and clear, is best heard in the base of the heart. Its cause is simple and there seems to be no discussion about it. It is due to the closure of the aortic and pulmonary semilunar valves at the end of systole which causes vibrations to be set up in the valves and in the walls of the aorta and pulmonary artery. It is composed of 3–4 principal vibrations with rapid decrement. The frequency is about 50 per second: the duration 0·10–0·14 sec. It corresponds to the notch constantly present in the venous pulse curve optically recorded, and also to the incisura or dicrotic notch of the central arterial pulse. Its relations with the electrocardiogram are not so constant: it falls approximately in front of the end of the T wave but may precede or follow it.

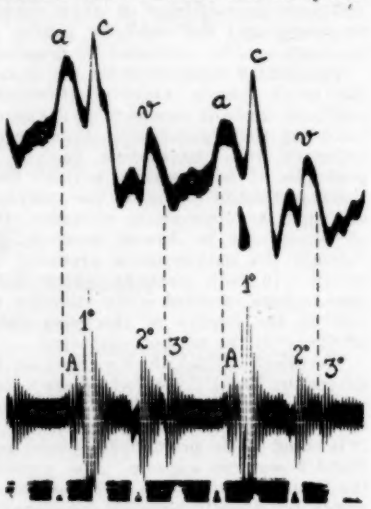

FIG. 1.—*The four normal heart sounds.*—Venous pulse, phonocardiogram, and time in 1/5 sec. The auricular sound (A) appears 0·04 sec. after the beginning of the "a" wave of the venous pulse. The third heart sound (3°) coincides with the last portion of the descending limb of the "v" wave (end of the rapid filling phase) (Braun-Menendez and Orias 1934, 1935).

THE THIRD SOUND

The third sound, as already mentioned, was first described by Gibson (1907), who not only recognised

its physiological character but also described its principal attributes. "The sound," he said, "is by no means easy to hear. . . . Nor is it possible to hear the sound at every systole: from my own observations it is best heard in the short interval between expiration and inspiration. The quality of the sound is low-pitched and clear, with no suspicion of harshness or anything suggesting a murmur. It is slightly increased in intensity and raised in pitch by pressure on the abdomen."

The audibility of the third heart sound has been denied by some authors; others say it is only heard in rare instances. But Thayer (1909), a great clinician of the United States, heard it in 50–65 per cent. of normal adults; Gubergritz (1925) in 90–93 per cent. of adults; and Steinberg (1925) in 95 per cent. of children. Our own experience has shown that the third sound is very often heard by auscultation, but is often interpreted as a reduplication of the second sound (Cossio and Braun-Menendez 1935b). The graphic registration of the heart sounds, together

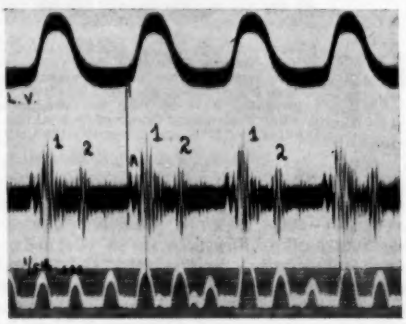

FIG. 2.—Left intraventricular pressure (L.V.) recorded with the Wiggers manometer, and heart sounds recorded from the ventricular surface by means of a Wiggers and Dean capsule. Time in 1/5 sec. Vibrations of low frequency (A) can be seen preceding the rise in ventricular pressure, which must be ascribed to some late effect of auricular contraction (Orias and Braun-Menendez 1937).

with the venous pulse, allows of clear definition between the two.

The same year as Gibson discovered the third sound, Einthoven, who had been recording the heart sounds in normal persons, found in a few of his records a group of vibrations that appeared 0·13 sec. after the beginning of the second sound (Einthoven 1907). In 1915 Bridgman found more or less marked vibrations corresponding in time to the third heart sound in all the records of 16 boys he examined. Leonhardt (1932) found, also in children, the third sound in 83 per cent. of cases, and Clerc and his colleagues (1934) in all of 30 adults examined. In 1934, with Prof. Orias, I took heart-sound records together with the venous pulse in 100 medical students. We were surprised, not being at that time acquainted with the literature, to find more than two heart sounds in 70 per cent. of cases. The third heart sound was present in 60, the auricular sound in 20, and 10 students had four heart sounds: the auricular, first, second, and third (Braun-Menendez and Orias 1934, 1935a, b) (Fig. 1).

The third sound, composed of a variable number of vibrations, varies also in amplitude and duration (0·07 to 0·10 sec.) according to the area of the chest from which it is recorded and to the phases of respiration. Its principal characteristic is the moment at which it is produced: in every case the third sound coincides with the last portion of the descending

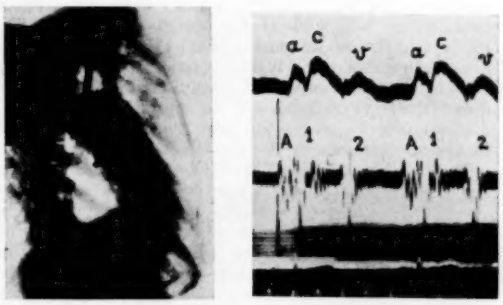

FIG. 3.—Auricular sound recorded from the œsophagus. Venous pulse, heart sounds recorded from the œsophagus and electrocardiogram in a healthy young man. An auricular sound is seen beginning slightly in advance of the "a" wave of the venous pulse and 0·05 sec. after the rise of the P wave. The X ray picture shows the position of the explorer introduced in the œsophagus (Taquini 1936).

limb of the "v" wave of the venous pulse, or, in other words, it coincides with the end of the rapid filling phase (Braun-Menendez and Orias 1934, 1935a). Its distance from the second sound depends on the duration of the isometric relaxation phase plus the rapid filling phase. In normal persons these phases have a fairly constant duration (Braun-Menendez and Orias 1935a), and this explains why the third heart sound appears in most cases 0·11–0·14 sec. after the beginning of the second sound. Taking into account the moment at which the third sound is produced, we believe it is principally caused by vibrations set up in the ventricular walls by the inrush of blood in early diastole. It is probably a constant phenomenon, and whether it is heard or recorded depends chiefly on the sensitivity of the ear or of the recording apparatus.

THE FOURTH SOUND

Let us consider now the auricular heart sound. There has been much discussion, which still continues, as to the existence and importance of sounds due to the auricular contraction. I cannot enter now into a thorough study of this much-debated question, but must try to answer certain questions.

First of all: is there any audible auricular sound when the stethoscope is placed over the exposed heart in normal animals? I think I had better quote the tenth conclusion of the report on the Motions and Sounds of the Heart by the London Committee of the British Association for the Advancement of Science, signed by John Clendinning in 1840:—

"That the auricular systole is attended by an intrinsic sound resembling that of the ventricles but more short, obtuse, and feeble. This auricular systolic sound is often difficult of detection, even on the naked heart, and with tolerably vigorous action of the auricles, owing to its being, to the inexperienced ear, absorbed in, or masked by, the immediately-succeeding and vastly louder systolic ventricular sound."

I quite agree with Clendinning. It is very difficult to hear such a weak sound, and here I quote him again, "not separated by any very distinct interval from the succeeding ventricular sound which, however, it precedes rather, and certainly precedes to the senses of touch and hearing together, the hardening and rounding of the ventricle." But the graphic methods show that in normal dogs when the sounds are directly recorded from the ventricular surface together with the intraventricular pressure as Wiggers

and Dean (1917a, b) and Orias and I have done, vibrations occur before the rise of pressure in the ventricle (Orias and Braun-Menendez 1937) (Fig. 2). That they are of auricular origin is demonstrated, because if the P–R interval is increased by stimulation of the vagus nerve these vibrations will be separated by a more distinct interval from the first sound and they will disappear if auricular fibrillation intervenes.

It may be concluded that in the normal dog the auricular contraction always produces a sound. Is this also true in man? At this stage of our investigations we were inclined to answer yes, but we had no conclusive proof. At that time Dr. Taquini was studying in our laboratory the exploration of the heart via the œsophagus, and one part of this study included the recording of the normal and pathological pulsations of the œsophagus. We used for this object a rubber tube one metre long graduated in centimetres, and with 5 mm. internal diameter and 2 mm. thickness. Attached to its end was a lantern, similar to that used by Chauveau and Marey for the investigation of changes in pressure within the ventricles of the horse, consisting of a framework of wire covered with thin rubber dam. During one of these explorations (which, I may say, are rather uncomfortable for the patient) it occurred to us to attach a stethoscope to the end of the rubber tube. We were astonished, since the subject was a normal person, to hear very distinctly three heart sounds per cycle, this extra sound being most clearly heard when the end of the tube was about 30 cm. from the incisor teeth. We then connected the tube to a Wiggers and Dean capsule and recorded simultaneously the venous pulse and the electrocardiogram. The extra sound was an auricular sound (Taquini and Braun-Menendez 1935b). In more than 50 normal subjects we have made the same exploration and *always* a clear auricular sound was heard and recorded (Fig. 3).

If we now record the sounds on the surface of the chest in normal persons we will find an auricular sound more or less commonly according to (1) the sensitivity of the recording apparatus and to the range of frequencies it is capable of recording; and (2) various factors depending on the subject. Of these we may mention the intensity of auricular vibrations; their tonality or pitch; the duration of the sound; its distance from the first sound; the distance of the heart from the surface of the chest; and the capacity of the interposed tissues to propagate the sound. All these circumstances account for the discrepancies found in the literature as to the frequency with which the auricular sound appears in the records obtained from the surface of the chest. The first systematic investigation was made by Bridgman (1914) who found a normal presystolic sound in 11 of 16 records obtained in schoolboys (68 per cent.).

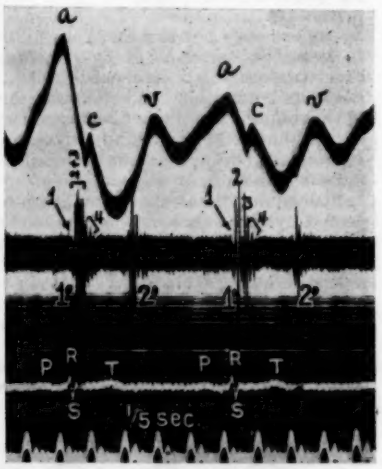

FIG. 4.—*Splitting of the first heart sound.*—Diagnosis was made in this case by auscultation. The record shows that the vibrations of the first heart sound are split into two principal groups. This is only the exaggeration of what is normally found in most of the normal subjects (Orias and Braun-Menendez 1937).

With Orias I recorded it in 20 out of 100 normal students (1934, 1935b). Caeiro and Orias (1937) with a more sensitive device have recorded auricular vibrations in 85 per cent. of 20 normal young adults; Segura (1937) in 38 per cent. of normal babies; Pereira in 72 per cent. of normal women. These are the only systematic investigations that have been made, but most of those who have recorded the heart sounds have seen occasionally an auricular sound in records of normal persons (Orias and Braun-Menendez 1937).

The graphic registration of auricular sounds in various conditons taught us that their time relations with the P wave of the electrocardiogram was not a constant one. It appeared to be a long and complex sound due to vibrations of multiple origin, and depending on the circumstances one or other group of its constituent vibrations came to the foreground (Braun-Menendez and Solari 1936a, b, Braun-Menendez and Orias 1936, Cossio and Braun-Menendez 1935b). It is important to have in mind this complexity of the sounds due to auricular contraction that has actually been found by experiment (Braun-Menendez and Solari 1936b), to understand the participation and configuration of the auricular sounds recorded in various conditions.

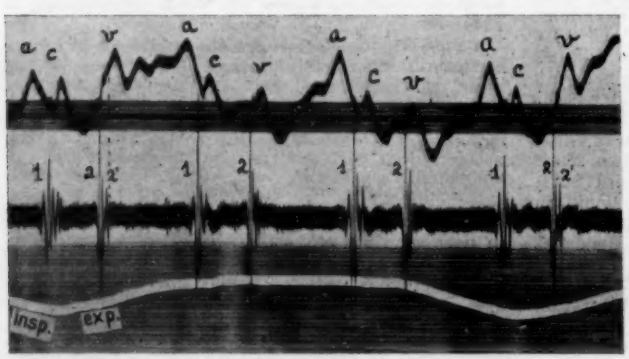

FIG. 5.—*Splitting of the second sound.*—Venous pulse, heart sounds, and respiratory movements in a normal subject. A splitting of the second sound can be seen at the end of inspiration. Both groups of vibrations precede the apex of the "v" wave (Orias and Braun-Menendez 1937).

AUSCULTATION

In normal conditions by auscultation it is seldom possible to recognise the auricular sound. It is a weak sound and its proximity to the much louder first sound helps to make its recognition difficult. But this does not mean that it is inaudible. Far from it; in a relatively high proportion of normal subjects the auricular sound is heard but not recognised as such. The impression gained by auscultation is that of an impurity of the first sound, or when the auricular sound is louder, of a reduplication of the first sound.

The graphic registration has shown us that in a great proportion of cases in which by auscultation a diagnosis of reduplication of the first heart sound is made there is really a normal auricular sound (Cossio and Braun-Menendez 1935a, b). Even some French cardiologists, who do not accept the possibility of the auricular sound being heard in normal persons, have auscultated it and recorded it (Segura 1937). I may say here that as far back as 1875 Potain the great French cardiologist, one of the masters of auscultation of the heart, referring to the presystolic gallop rhythm wrote :—

" si on ausculte avec cette préoccupation un bon nombre de gens bien portants, on ne tarde pas à s'apercevoir que le grand silence n'est pas toujours absolument silencieux ; que, à cette place ou nous voyons se produire le bruit anormal qui fait le galop, il y a parfois déjà à l'état de vestige, quelque chose qui, en s'exagérant, pourra dévenir le bruit en question."

In other words, that it was possible in normal persons to hear sometimes a faint presystolic sound.

I may safely conclude that in normal men the auricular contraction constantly gives rise to complex vibratory phenomena of long duration, which are always heard and recorded when the heart is explored via the œsophagus and which are often heard under ordinary conditions of precordial auscultation and even more often recorded.

Summarising, the heart action gives rise to four sounds per cycle of which the auricular, the first, the second, and probably also the third are constant. By auscultation of the chest in normal persons the first and the second sound are always distinctly heard, the third in a high proportion of cases, the auricular less frequently. It is essential to acknowledge the existence of these additional sounds in order to interpret correctly auscultatory findings in normal and pathological conditions. Owing to the presence of an audible auricular sound in normal cases an erroneous diagnosis may arise such as mitral stenosis reduplication, or impurity of the first sound, and even presystolic gallop rhythm. It will shortly become evident that most of the auscultatory findings in pathological conditions, excluding murmurs, which I will not consider here, are due to the pathological modifications in intensity and position of the auricular and third sounds.

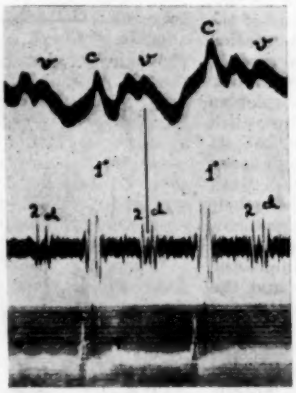

FIG. 6.—*Opening snap of the mitral valve.*— Venous pulse, heart sounds, and electrocardiogram in a case of mitral stenosis and auricular fibrillation. The group of vibrations following the second sound coincide with the apex of the " v " wave ; that is to say, with the moment at which the auriculo-ventricular valves open. It is an opening snap of the mitral valve (Battro and Braun-Menendez 1934, 1935).

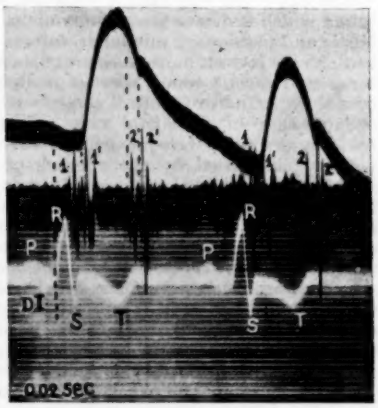

FIG. 8.—Splitting of the second sound in a case of bundle-branch block. Central arterial pulse, heart sounds, and electrocardiogram (lead I). Time in 1/50 sec. The second sound is composed of two groups of vibrations (2 and 2'). The second of these coincides with the bottom of the incisura (aortic sound) while the first precedes it by about 0·06 sec. (pulmonary sound) (Battro, Braun-Menendez, and Orias 1936).

Reduplication

By reduplication of the heart sounds is usually meant the splitting into two groups of its component vibrations. But the word reduplication is bad for the purpose, because it is indefinite and may cause ambiguity ; it is better to speak of splitting of the heart sounds.

The splitting of the first sound may be found in persons with normal or pathological hearts (Fig. 4). It has no special significance by itself, and, except in bundle-branch block, is only an exaggeration of the separation that is normally encountered between its two constituent groups of vibrations (Orias and Braun-Menendez 1937). This separation may become so distinct that, by auscultation, the two groups are separately heard and the correct diagnosis is made. But auscultation is not always so precise in its localisation of sounds, and very often the diagnosis is made of split first heart sound when there is in reality an aggregation to the first sound of a normal or a pathological auricular sound. We have investigated the matter and have seen that in many of the cases where a diagnosis is made upon auscultation of split first sound, the real cause for this auscultatory impression is the presence of an auricular sound (Cossio and Braun-Menendez 1935b).

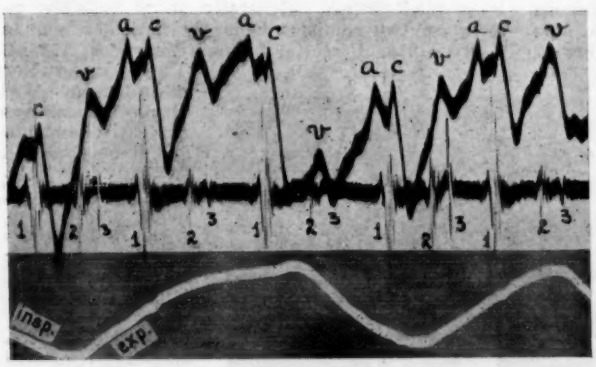

FIG. 7.—*Physiological third heart sound.*—Venous pulse, heart sounds, and respiratory movements recorded in a girl. On auscultation a diagnosis was made of reduplication of the second sound. The records showed that this auscultatory impression was due to the presence of a sound (3) that appeared in front of the last portion of the descending limb of the " v " wave. It is a physiological third sound (Cossio and Braun-Menendez 1935).

The same may be said of splitting of the second sound which is due to the asynchronous closure of the aortic and pulmonary semilunar valves. Auscultation in this case is even more inaccurate since it may take for a split second sound what is really the existence of a third sound or if mitral stenosis is present of an opening snap of the mitral valve. The latter called by the French "claquement d'ouverture de la mitrale" is caused by the opening of the diseased mitral valve in mitral stenosis. In many cases, even to those who have frequently compared their auscultatory findings with the corresponding phonocardiogram, it is impossible to decide between these two possibilities. Then recourse must be made to the simultaneous recording of the heart sounds and the venous pulse. In true reduplication of the second sound—I mean splitting of the second sound—both groups of vibrations, in which the sound is split, occur before the summit of the "v" wave (Fig. 5) (Orias and Braun-Menendez 1937, Cossio and Braun-Menendez 1935a), the opening snap of the mitral valve appears in front of the summit of the "v" wave (Fig. 6) (Cossio and Orias 1935); the third heart sound will be as we know in front of the last portion of the descending limb of the "v" wave (Fig. 7) (Braun-Menendez and Orias 1934, 1935a, b). The ear is in most cases unable to distinguish such small time differences, but a knowledge of the possibility of occurrence and of the different mechanism of these sounds enables the expert clinician to arrive at a close approximation to the exact diagnosis. The real splitting is due to the asynchronous closure of aortic and pulmonary valves and the second component of the split sound is best heard at the base of the heart. The opening snap is best heard in the fourth or fifth intercostal space near the sternum, and the physiological third sound is best heard at the apex of the heart.

The graphic methods enable us also to attribute to its real cause each of the two groups in which the second sound is split. Of these two groups one corresponds to aortic valve closure and the other to pulmonary valve closure. If simultaneously with the heart sounds the subclavian or carotid pulse is recorded, the incisura of the pulse curve, the so-called dicrotic notch, which is due to, and practically simultaneous with, the closure of the aortic valves, will coincide with the group of vibrations representing the closure of these valves (Fig. 8). The vibrations due to pulmonary valve closure will precede or follow this incisura (Wolferth and Margolies 1935). By simultaneously recording various manifestations of the heart activity in bundle-branch block, this criterion and many others may be obtained allowing us to locate precisely the branch involved (Battro, Braun-Menendez, and Orias 1934, 1935a).

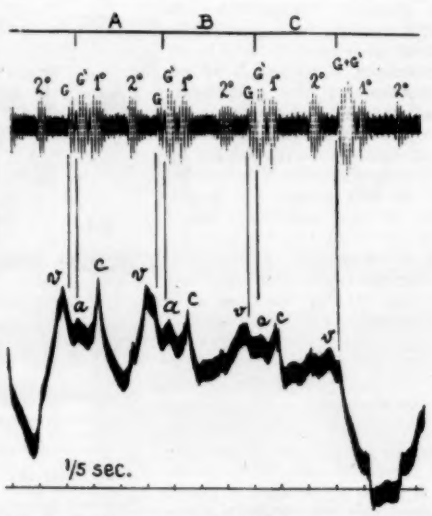

FIG. 10.—Summation gallop, complete and incomplete. Heart sounds and venous pulse recorded in a patient with gallop rhythm. Time in 1/5 sec. In cycles A and B in addition to the first and second sounds there appear very close to one another two additional sounds, G and G'. The sound G coincides with the descending limb of the "v" wave and is a rapid filling gallop; the sound G' coincides with the "a" wave and is a presystolic or auricular gallop. In cycle C the diastole is shortened due to inspiration and the sounds G and G' are summated. It is therefore a summation gallop, incomplete in cycles A and B, complete in cycle C (Battro, Braun-Menendez, and Orias 1934, 1935).

Heart-block

In complete auriculo-ventricular block very many auscultatory signs have been described, two of which I shall mention—namely, faint sounds in the middle of diastole, and occasional loudness of the first sound.

The phonocardiographic analysis made in this arrhythmia shows that these manifestations are due to the fact that auricular contractions occur at different moments with regard to ventricular contraction (Fig. 9). When auricular contraction falls well between two ventricular beats a complex auricular sound is clearly recorded corresponding to each P or "a" wave. Generally it is possible to recognise two components in the auricular sounds (Lewis 1915, Cossio and Braun-Menendez 1935b). The auricular sounds in A-V block are always perfectly audible and it may be due to the fact that the exaggerated filling of the ventricle is a favourable condition for its perception.

The other auscultatory sign in A-V block—namely, the occasional reinforcement of the first heart sound—occurs, as phonocardiography clearly shows, each time

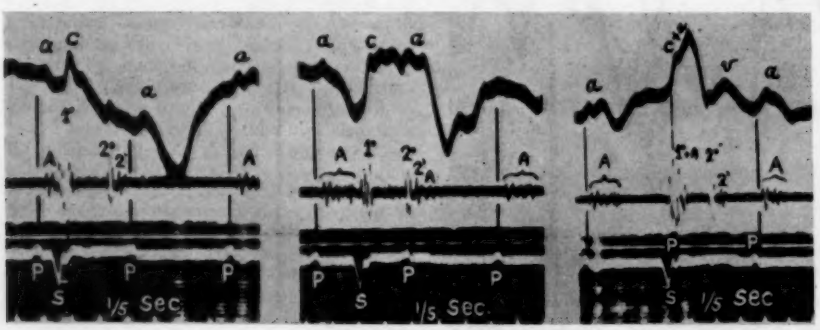

FIG. 9.—The auricular sound in auriculo-ventricular block. Venous pulse, heart sounds, and electrocardiogram in a patient with complete A-V block, showing some phonocardiographic pictures given by different grades of coincidence between auricular and ventricular contraction. Time in 1/5 sec. (Orias and Braun-Menendez 1937).

the auricular contraction falls in the proximity of the beginning of ventricular systole (Orias and Braun-Menendez 1937, Cossio and Braun-Menendez 1935a, Lewis 1915). The different grades of coincidence give interesting phonocardiographic pictures though auscultation is unable to detect them. The graphic and acoustic particularities of the heart sounds in other grades of heart-block (partial or incomplete) derive essentially from similar conditions to those that preside in complete block. I am afraid I have treated this chapter rather superficially, but my only aim has been to impress upon you the important part the auricular sound can play in the auscultatory manifestations of this malady though, in many of these cases, the efficiency of the heart is not much impaired.

Gallop Rhythm

In some circumstances auscultation of the heart reveals the existence of three loud sounds per cycle, which, bearing a particular time relation to each other, give an auditory impression similar to that produced by a galloping horse. This gallop rhythm is an important clinical entity which has been thoroughly studied by very many investigators. But nevertheless, owing to various causes which would take me too long to discuss here, the true significance and meaning of this rhythm has not always been clearly shown.

The simultaneous registration of the heart sounds with the venous pulse, which is, as I have already said, the only tracing which enables us to recognise the diastolic phases of the cardiac cycle, has shown us that gallop rhythm is due to extra sounds arising in well-defined moments of cardiac activity (Battro, Braun-Menendez, and Orias 1934, 1935). These extra sounds are no more than the exaggeration of the normal auricular and third heart sounds. We have demonstrated that the extra sound in gallop rhythm may appear:—

1. In front of the "a" wave of the venous tracing; it has then the signification of an exaggerated auricular sound. This we called presystolic or auricular gallop.

2. In front of the descending limb of the "v" wave; it has then the significance of an exaggerated third sound. This we called the rapid filling gallop.

3. Finally the extra sound may arise at a moment in which, owing to the rapid heart-rate, both phases, auricular systole and rapid filling are close together (Fig. 10). In this case the sound is located in front of the point where the descending limb of the "v" wave is interrupted by the beginning of the "a" wave. This we called complete summation gallop. In some cases due to imperfect coincidence of these two phases both sounds exist independently though very near one another. This we called incomplete summation gallop.

These pathological extra sounds which are only the exaggeration of normal sounds, may exist without giving rise to a gallop rhythm because of the absence of tachycardia that would give the appropriate intervals for such a rhythm to arise. Conversely such rhythm may appear in perfectly normal subjects when a normal auricular sound sufficiently loud to be heard by auscultation is accompanied by a fast heart-rate due to emotion or other causes. These considerations led Wolferth and Margolies (1933) very wisely to establish that the term gallop rhythm should only be employed when cardiovascular functions or structures were proved to be abnormal.

It has not been my purpose to cover the whole subject of phonocardiography but only to choose some few of the problems which have been elucidated by its aid. There are still many gaps to fill and, I hope, they will be filled in the near future. Auscultation of the heart, though it has not now the importance that was attached to it in the last century, is nevertheless an essential step in diagnosis; so essential, that for the mass of the people a man without a stethoscope cannot be a doctor. The graphic registration of the heart sounds is to auscultation what electrocardiography is to the arrhythmias: the clinician to-day is able to diagnose most of the arrhythmias at the bedside because he has learned to recognise and classify them by means of the electrocardiogram. The intimate association between auscultation and phonocardiography is evidently of great value for teaching purposes and for the education of the ear, and what is more important, it is absolutely essential for a full comprehension of auscultatory findings (Lewis 1915).

REFERENCES

Battro, A., Braun-Menendez, E., and Orias, O. (1934) *Rev. argent. Cardiol.* **1**, 117.
— — — (1935) *J. Physiol. Path. gén.* **33**, 51.
— — — (1936) *Rev. argent. Cardiol.* **3**, 325.
— — (1937) *Ibid*, **4**, 1.
Braun-Menendez, E., and Orias, O. (1934) *Ibid*, **1**, 101.
— — (1935a) *J. Physiol. Path. gén.* **33**, 39.
— — (1935b) *Rev. argent. Cardiol.* **2**, 186.
— — (1936) *Pr. méd.* **1**, 603.
— and Solari, L. A. (1936a) *Rev. Soc. argent. Biol.* **12**, 331.
— — (1936b) *C.R. Soc. Biol. Paris*, **123**, 502.
Bridgman, E. W. (1914) *Arch. intern. Med.* **14**, 475.
— (1915) *Heart*, **6**, 41.
Caeiro, A., and Orias, O. (1937) *Rev. argent. Cardiol.* **4**, 71.
Clerc, A., Zadoc-Kahn, B., and Tavecchi, G. (1934) *C.R. Soc. Biol. Paris*, **116**, 1017.
Cossio, P., and Orias, O. (1935) *Rev. argent. Cardiol.* **1**, 451.
— and Braun-Menendez, E. (1935a) *Ibid*, **2**, 1.
— — (1935b) *Ibid*, p. 149.
Einthoven, W. (1907) *Pflüg. Arch. ges. Physiol.* **120**, 31.
Frank, O. (1904) *Münch. med. Wschr.* **51**, 953.
Gibson, A. G. (1907) *Lancet*, **2**, 1380.
Gubergritz, M. M. (1925) *Z. klin. Med.* **102**, 109.
Leonhardt, W. (1932) *Z. ges. exp. Med.* **84**, 470.
Lewis, T. (1915) Lectures on the Heart, New York.
Orias, O., and Braun-Menendez, E. (1937) Los ruidos cardíacos en condiciones normales y patológicas, Buenos Aires.
Pereira, J. C., Unpublished results.
Potain, C. (1875) *Bull. Soc. méd. Hôp. Paris*, **12**, 137.
Routier, D., and Van Bogaert, A. (1934) *Arch. Mal. Cœur*, **27**, 541.
Segura, A. S. (1937) Registro e interpretación de la actividad Cardiovascular en el lactante normal. Córdoba (R.A.), Instituto de Fisiología.
Steinberg, L. D. (1925) *Z. Kinderheilk.* **40**, 620.
Taquini, A. C., and Braun-Menendez, E. (1935a) *Rev. Soc. argent. Biol.* **11**, 410.
— — (1935b) *C.R. Soc. Biol. Paris*, **120**, 728.
— (1936) Exploración del corazón por vía esofágica, Buenos Aires.
Thayer, W. S. (1909) *Arch. intern. Med.* **4**, 297.
Wiggers, C. J., and Dean, A. L. (Jr.) (1917a) *Amer. J. med. Sci.* **153**, 666.
— — (1917b) *Amer. J. Physiol.* **42**, 476.
— (1937) Physiology in Health and Disease, London.
Wolferth, C. C., and Margolies, A. (1933) *Amer. Heart J.* **8**, 441.
— — (1935) *Ibid*, **10**, 425.

THE LANCET 100 YEARS AGO

September 29th, 1838, p. 43.

From a lecture delivered by M. Magendie at the College of France.

. . . Medical men may be divided into two classes; those forming the first give up all study the moment they leave off attending lectures; they quite conscientiously believe, and frequently succeed in persuading others, that they understand every disease, and can cure every variety of suffering; these gentry occasionally realise a handsome fortune, but I must say they do so at the expense of science and of the interests of their fellow men. Their numbers explain to my mind marvellously well the discredit into which medicine seems to have fallen at the present day, and the high favour lavished by the public on quacks of every grade. The second class of practitioners continue, it is true, to follow clinical pursuits with zeal, but some among them, misled by scholastic errors, retard rather than accelerate the progress of the science. . . .

DURATION OF ACTION OF ZINC PROTAMINE INSULIN

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The observations here reported were made, mostly in the first few months after zinc protamine insulin became available in England, with a view to determining the approximate duration of its action in diabetics. Most of the statements on this subject have been to the effect that the action could be prolonged beyond 24 hours. Lawrence and Archer (1937) wrote that moderate doses continued their action for 24 hours, larger doses even longer. Bennett and his colleagues (1937) on the other hand were "unable to confirm the suggestion that cumulative effects might occur" from a prolongation of action beyond 24 hours. It seemed likely that precise observations on a limited number of diabetics might lead to a clearer picture of how long zinc protamine insulin is acting when used in routine treatment.

The patients investigated were kept at rest in bed, and given weighed and measured diets with unrestricted fluid intake. No blood-sugar determinations were made but the urinary excretion of sugar in three-hour periods was measured, and the presence or absence of acetone (Rothera's test) recorded. Small amounts of thymol and sodium fluoride were added to the urines when passed, and they were then kept at ice temperature until the estimations, by Benedict's method, were made. When the rate of sugar excretion became maximum and approximately constant a dose of zinc protamine insulin (Boots) was given subcutaneously. The duration of its action was taken as the time from the giving of the injection until either (*a*) the return of the glycosuria to its pre-injection level, or (*b*) the reappearance of acetone (if previously present) in the urine. The two reckonings gave closely similar results. The effect of the insulin is on the whole easier to judge from the measurement of sugar excretion than from blood-sugar records. The blood-sugar level results from combined variations in the rate of entry of sugar from the gut and the liver into the blood, and in the rate of its exit from the blood into liver, tissues, and urine; its fluctuations reflect changes in any or all of these. On the other hand, the sugar excretion on a constant dietary intake reflects fairly closely the amount of sugar utilised by the body, and the fundamental purpose of insulin in diabetes is to increase that utilisation.

The results obtained in five patients are set out in the accompanying charts (Figs. 1 to 5), the legends to which explain certain minor experimental variations. The heights of the columns in each case indicate rate of excretion of sugar in grammes per hour. Black columns indicate glycosuria accompanied by acetonuria; shaded columns indicate glycosuria without acetonuria. The observations on each patient are continuous, but the records are divided into successive portions placed one above another for convenience of comparison. Z.P.I. = zinc protamine insulin (Boots).

DURATION OF ACTION

From the charts in Figs. 1–5 the duration of action of zinc protamine insulin in the doses given can usually be judged to the nearest 3 or 6 hours. The durations are given in the Table, which includes the findings in a sixth patient, on whom similar observations were made at two different levels of dietary carbohydrate intake. From the Table the following conclusions may be drawn:

(1) The duration of action of zinc protamine insulin varies roughly with the dose, and with doses of 50–100 units can reach 48–60 hours.

(2) The duration of action of a given dose varies from patient to patient.

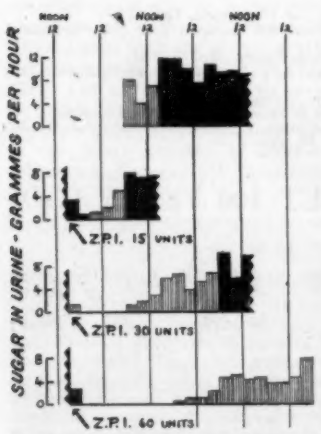

FIG. 1.—Boy aged 11; diabetes of 7 years' duration and moderate severity. Diet: 400 g. of carbohydrate per day (no protein; no fat), given in 3-hourly feeds of 50 g. each.

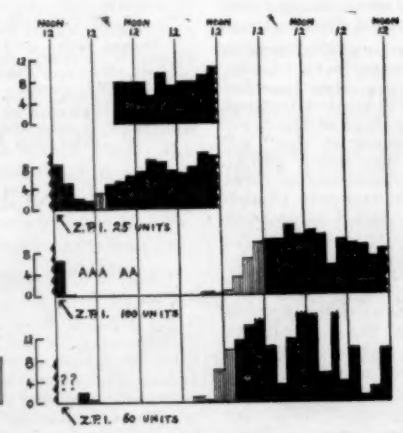

FIG. 2.—Boy aged 13; diabetes of 5 years' duration and considerable severity. Diet: carbohydrate 268 g., protein 40 g., fat 60 g., per day, given in eight equal feeds at 3-hour intervals. A indicates slight acetonuria without glycosuria.

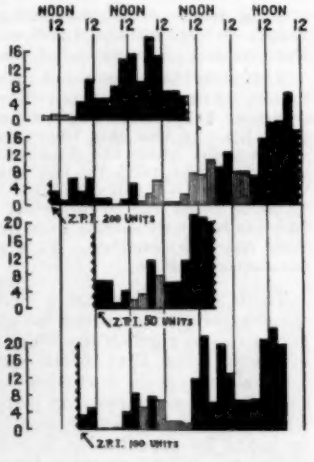

FIG. 3.*—Girl aged 17; diabetes of 5 years' duration and considerable severity. Diet: carbohydrate 295 g., protein 75 g., fat 75 g., per day, given in four principal meals with intermediate glucose drinks.

*The sugar excretion is less regular than in the other observations because the carbohydrate intake is not evenly spread over the 24 hours.

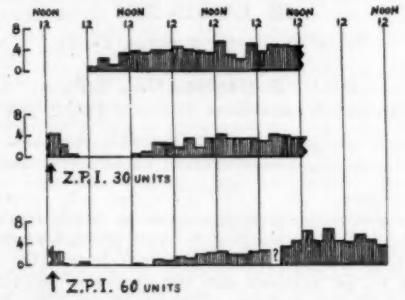

FIG. 4.—Woman aged 36; diabetes of 2 years' duration and slight to moderate severity; 2½ months pregnant. Diet: carbohydrate 208 g., protein 80 g., fat 88 g., per day, given in eight equal feeds at 3-hour intervals.

(3) Dividing the dose among several sites of injection causes some shortening and intensification of the action.

(4) It is possible that in a given patient the duration of action of a given dose is longer when the carbohydrate intake is moderate and shorter when it is high. This is suggested by the observation on the sixth patient, but is not established. In that patient the dose of 40 units on a diet of C. 162 g., P. 82 g., F. 80 g. acted for 60 hours, during part of which time the urine was sugar-free, while the same doses on a diet of C. 344 g., P. 82 g., F. 80 g. acted for not more than 36 hours, during which time the glycosuria was diminished but never absent.

TABLE SHOWING DURATION OF ACTION OF ZINC PROTAMINE INSULIN ON GLYCOSURIA AND ACETONURIA

Case and age.	Z.P.I. (units).	Duration of action— On glycosuria (hours).	Duration of action— On acetonuria (hours).	Case and age.	Z.P.I. (units).	Duration of action— On glycosuria (hours).	Duration of action— On acetonuria (hours).
1	15	15	15	4	30	38–47	..
(11)	30	39	39	(36)	60	62–68	..
	60	60	63+				
2	25	27	..	5	100	54	63
(13)	60	48	51	(17)	25 × 4	39	48
	100	57	60		12·5 × 8	39	42
3	50	18–24	18–24	6	40†	60	..
(17)	100	39	39	(39)	40‡	36	..
	200	54	57–69		160‡	84+	..

† Diet of C. 162 g., P. 82 g., F. 80 g. in 3-hourly feeds.
‡ Diet of C. 344 g., P. 82 g., F. 80 g. in 3-hourly feeds.

TIME-COURSE OF ACTION

The time-course of the zinc protamine insulin action can be roughly judged from the charts in Figs. 1–5. In some instances the urine secreted between the third and the sixth hours after the insulin, and in others that between the sixth and the ninth hours, is sugar-free or almost sugar-free. That must mean that within the first three hours, or the first six hours, the injected insulin develops sufficient action to bring about the burning or storage of all the sugar entering the body from the gut, and at the same time causes the abnormal accumulation of sugar initially present in blood and tissue fluids to be metabolised. That requires a greater amount of insulin action than is subsequently needed merely to deal with the incoming sugar and to keep the urine sugar-free. Insulin action is here thought of not simply as the lowering of blood-sugar concentration but as the promotion of the metabolism of extra carbohydrate in the body; it should be measured—if that were technically possible—in terms of grammes per hour of extra sugar burnt or stored. It is clear that extra sugar must be being burnt or stored at a very considerable rate within the first three to six hours after nearly all of these zinc protamine insulin injections; the rate may quite likely be maximal within that time, and gradually diminishing after it. This is apparently at variance with some published statements—e.g., "The action of protamine zinc insulin is delayed so that the period of greatest effectiveness often occurs twelve or more hours after its administration" (Richardson 1937); and "the development of zinc protamine insulin action may be so long delayed that the full effect of the morning dose does not appear until the evening" (Himsworth 1937). Those statements probably refer rather to the hypoglycæmia following the injection of the insulin than to the actual physiological action of the insulin, for as already mentioned the blood-sugar level is influenced by more factors than insulin action, especially in patients receiving ordinary meals of varying composition and not confined to bed.

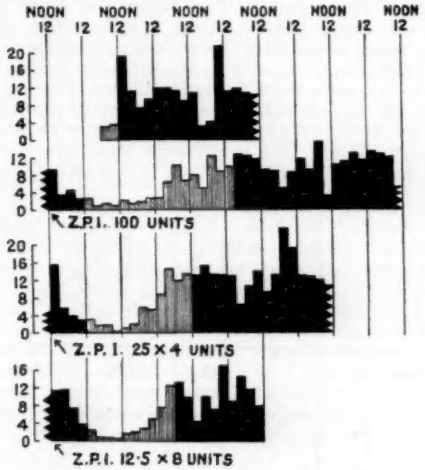

FIG. 5.—Girl aged 17; diabetes of 18 months' duration and considerable severity. Diet: carbohydrate 268 g., protein 40 g., fat 60 g., given in eight equal feeds at 3-hour intervals. The dose of zinc protamine insulin, 100 units, was first given in a single injection; on the second occasion it was divided into four portions of 25 units each, injected at four different sites; on the third occasion into eight portions of 12·5 units each, injected at eight different sites.

In most of the observations here reported the increase of glycosuria in the later periods after zinc protamine insulin injection is more gradual than its decrease in the earlier periods. This is what would be expected if the insulin activity is determined simply by the rate of solution of the solid zinc protamine insulin compound deposited as a suspension at the site of injection. Such solution should begin at once; its rate should reach a maximum soon, and then diminish as the residue of solid material in the depôt becomes smaller. If, as these observations may be taken to suggest, that maximum is achieved within the first six hours, the time-course of the physiological action of equal daily morning doses of zinc protamine insulin can be represented, diagrammatically and approximately, as in Fig. 6.

In the upper part of this Figure the single lines represent the activities of the separate doses, each being taken as reaching its maximum instantaneously and diminishing to zero in 48 hours; the double line shows the summated activities of the overlapping doses. In the lower diagram the curve of summated activity is smoothed and the maximum shown at about 3 hours. This is a nearer approximation to what happens in patients. If it is correct it justifies

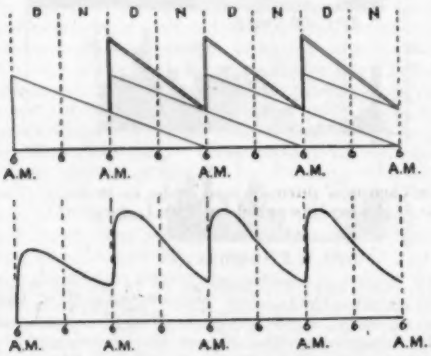

FIG. 6.—Daily morning dose of Z.P.I. such as to act for 48 hours: schematic diagram of the course and summation of insulin action. (D = day, N = night.)

the now prevalent custom of giving zinc protamine insulin as a single morning dose, and it gives some indication of how the carbohydrate intake should be spaced throughout the 24 hours if it is to run roughly parallel to the insulin activity. A curve of similar shape, set a little higher, would apply to a case in which the dose of zinc protamine insulin chosen acted for 48–72 hours.

It is well recognised that zinc protamine insulin does not appear to behave with this arithmetical regularity in every patient. Divergences may be attributable in part to irregularities in its rate of solution, depending on varying conditions of the tissues and their blood-vessels at the site of injection, on varying degrees of spread of the suspension through the tissues, and perhaps on varying degrees of aggregation of the suspended particles. They may also be due in part, as Graham (1938) has suggested, to fluctuations in the severity of the diabetes itself, such as were not uncommonly observed before the newer insulins were introduced. In general, however, the observations recorded in this paper afford a valid guide to the clinical use of zinc protamine insulin.

SUMMARY

Observations of the effect of zinc protamine insulin on the glycosuria of diabetics receiving constant diets (usually in three-hourly feedings) indicate that a large and possibly maximal insulin effect is exerted on carbohydrate metabolism within 3–6 hours of the injection, and that the total duration of effect of doses lying between 15 and 100 units is 15–60 hours.

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REFERENCES

Bennett, T. I., Davie, T. M., Gairdner, D., and Gill, A. M. (1937) *Lancet*, **1**, 1319.
Graham, G. (1938) *Ibid*, July 16th, p. 121.
Himsworth, H. P. (1937) *Brit. med. J.* **1**, 541.
Lawrence, R. D., and Archer, N. (1937) *Ibid*, p. 487.
Richardson, R. (1937) *Amer. J. med. Sci.* **193**, 606.

AIR EMBOLISM

WITH REPORTS OF THREE CASES

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THE post-mortem appearances in death from air embolism are very striking to those present when the heart is first opened. They do not persist for late-comers to an autopsy and the specimen cannot be mounted for a museum. The symptoms are badly described in most text-books, where emphasis is usually laid on a hissing sound as air enters an open vein and on convulsions, neither of which is likely to be found in modern practice. In recent years most reported deaths from air embolism have followed criminal abortion. Thus Hamilton (1936) records a sudden death after the use of a syringe and soap solution which had stripped the placenta from an area measuring 6 by 5 in.

Coles, Richardson, and Hall (1937) throw some doubt on these cases and suggest that the findings on which the diagnosis is made are often really due to post-mortem changes brought about by gas-forming organisms—a mistake not likely to be made by anyone with experience. Applying their experimental work with dogs they deduce that about 480 c.cm. of air would be required to kill a human being. They think it unlikely that such a large quantity would enter by the uterine sinuses and suggest that many of the deaths are due to the introduction into the veins of soaps or chemicals which would be fatal in much smaller amounts.

There have been few instances of air embolism complicating labour at full term. In a case described by May (1857) the accident happened on the eighth day of her puerperium to a woman who had resumed her household duties. Gough (1924) records an example following forceps delivery for prolapsed cord.

Of our three cases two were women at full term; all were free from infection; in each the post-mortem examination was made before decomposition could complicate the findings; and none had been treated with chemicals.

CASE RECORDS

CASE 1.—The patient was a primigravida of 36 who had been married twice. The first marriage lasted eight years and there were no children by it. The second had taken place a year previously and the patient was very anxious to have a live baby. Antenatal examination showed a large fibroid in the region of the fundus. The diagonal conjugate was 4¼ in. and the transverse diameter of the outlet 3¼–3½ in. Because the head had not settled into the pelvis a week before term she was given a chloroform anæsthetic for a head-brim test. The head would not enter the pelvis. She was in apparently good health with a normal appetite for a week after this.

Labour then began with the head still free above the pelvic brim and the fœtus in the right occipito-posterior position. Cæsarean section was decided on. The usual midline incision was made under nitrous oxide, oxygen, and ether. The incision into the uterus was made to the right of the midline to avoid a fibroid. At this stage the patient's condition was good and the uterine blood was red, but she suddenly collapsed and the blood from the uterus became very dark. General cyanosis was obvious, her respirations became irregular, and her pulse could not be felt. Her condition then improved sufficiently for the fibroid to be shelled out at the top

of the incision and the fœtus, which weighed 8 lb. 11oz., to be delivered. The placenta was situated anteriorly near the fundus. The child (a male) was made to breathe with little trouble.

After the fœtus was delivered the uterus remained atonic and did not respond at all to injections of ergometrine or pituitary extract into its muscle; it resembled a bag of wash-leather. As a result there was excessive hæmorrhage. The uterine and abdominal wounds were closed in the usual way and she was taken into an ante-room of the theatre within 20 minutes. She recovered from the anæsthetic in 10–15 minutes but was cyanosed and had a weak pulse, and she resented a hand placed on the fundus for massage. Within half an hour she became deeply cyanosed and very restless, continually crying out and lashing her arms about. There was no obstruction to her air-way and she developed obvious air-hunger. In contrast with her deep breathing her pulse was imperceptible. She died three hours after the original collapse.

At the *autopsy* 10 hours later it was noted that she was well nourished and looked rather more than her age. She was deeply cyanosed, showed marked hypostasis, and was in full rigor mortis. The heart was of normal size. The blood was dark and on the right side of the heart there were innumerable air-bubbles mostly less than a tenth of an inch in diameter. The valves and coronary vessels were normal. The lungs were normal except for hypostasis. The peritoneal cavity contained about a pint of blood and fluid mixed; there were no clots. The liver was exceedingly pale—quite out of proportion to the rest of the organs—and microscopically showed rather severe fatty degeneration. The alimentary tract and kidneys were normal. The uterus was large and atonic, with no rigor. Microscopically many of the muscle-fibres had pyknotic nuclei. The placental site (left anteriorly and laterally at the fundus) was clean. The cervix was dilated. The vagina contained some fluid blood. There were many small fibroids throughout the uterine muscle. The tubes and ovaries appeared normal.

CASE 2.—Five months after the death of the above woman the coroner asked me (G. R. O.) to make a post-mortem examination of the body of a primigravida of 31 who had died mysteriously after a normal delivery. The history was so strikingly similar to that of the woman dying after the Cæsarean section that air embolism was suspected before the autopsy. The baby was born in a private hospital at 11.48 A.M. The doctor in attendance arrived when the head was on the perineum, and the patient had a light ether anæsthetic during the birth of the head only. The placenta was delivered normally at 12.15 P.M. The doctor gave her some pituitary extract and left her in good condition, the uterus being firm and the fundus at the level of the umbilicus. There had been no undue loss of blood. At 12.45 P.M. a nurse expressed some clots. The woman then collapsed. She became very restless and cyanosed, and waved her arms about. Her breathing was deep but her pulse imperceptible. She was given various stimulants without effect and died at 2.25 P.M.

At the *autopsy* the body was well nourished, there was full rigor, and marked cyanosis and hypostasis. There was no obvious decomposition. The muscles were of good colour and no organs showed any evidence of excessive blood loss. The heart was of about normal size. The valves and coronary vessels were normal. The right auricle, right ventricle, and pulmonary artery contained very large numbers of air-bubbles forming a froth with the dark blood. These bubbles were also mostly about a tenth of an inch in diameter. The left side of the heart contained a little dark fluid blood. The lungs were normal. The liver showed extensive fine fatty changes, the fat droplets in the cells being smaller than in the previous case. There was no fluid in the peritoneal cavity. The stomach contained a little watery fluid only. The kidneys were normal but there was some dilatation of the right ureter. The uterus was inverted with the inner part of the fundus at the internal os; it did not present into the vagina. There were no tears of the uterus or perineum. The inner surface of the uterus was clean except for a small placental remnant and some small clots. The vagina was not filled with blood. The tubes and ovaries were normal but were drawn into the upper part of the inverted uterus at the level of the symphysis pubis. The inversion had not been suspected during life and questions did not reveal when the fundus dropped from the level of the umbilicus to that of the symphysis pubis.

Both these cases showed definite fatty changes in the liver, a condition often found in unexpected deaths. In the first case the severity of this change may have been the reason for the extraordinary atonicity of the uterine muscle. The histories of the two cases from the time the air presumably gained access to the veins is strikingly similar and the times taken to die (3 and 1½ hours) are noteworthy. The third case is a pure curiosity but of some interest in view of the leading article in THE LANCET of Dec. 21st, 1935, and the subsequent letter of Brooke (Jan. 4th, 1936).

CASE 3.—On the coroner's instructions I made a post-mortem examination of the body of a boy of 16 whose death was quite unexpected. He was thought to be in good health. On April 9th, 1938, at midday he got a pain in his left hypochondrium while wheeling a bicycle up a hill. He returned home and was given a simple bismuth mixture after which he vomited a little. His condition did not cause any alarm. He was seen by a doctor several times and at 10 P.M. he was free from pain and in apparently good condition. His mother slept in his room in case he needed attention. At 1 A.M. he got out of bed to pass urine. He returned to bed with little trouble and then suddenly collapsed and died in about a minute. As his appetite had been unduly large food poisoning was suspected but there was nothing in any way suggestive of this.

Autopsy.—He was a well-developed boy. There was deep cyanosis, full rigor mortis, and marked hypostasis, but no obvious decomposition. The heart weighed about 15 oz.; the left ventricle was much hypertrophied. The right auricle, right ventricle, and pulmonary artery were filled with air-bubbles which were considerably larger than in the two women who took much longer to die after their initial collapse. The appearance of the pulmonary artery was especially striking. The left side of the heart contained dark fluid blood.

There were many old patchy pleural adhesions over the right lung; these were narrow with a small hæmorrhage at the base of each. The pleural cavity contained about 4 pints of blood, less than 1 pint of it clotted. There may have been a small amount of air with the blood, but, as the condition was not expected, the chest was opened in the usual way and it could not therefore be recognised. Posteriorly the right lung showed an extensive greenish gelatinous pleurisy. At the hilum of the right lung, close to an adhesion, there was a shallow tear about an inch long (this may have been where the air entered the vein; it could not have followed a tributary of the pulmonary vein). No pneumonia or obvious tuberculous lesion was seen in the lung. There was an extensive hæmorrhage into the mediastinal tissues.

The liver and alimentary tract appeared normal. The kidneys showed a severe chronic nephritis which was evidently responsible for the cardiac hypertrophy. They were small, pale, and had very adherent capsules. The renal pelves and ureters were normal. The bladder was empty; there was a hæmorrhage of about 2 oz. into the tissues to the left of it, which was not connected with the much larger hæmorrhage into the mediastinal tissues. There was no tear of the bladder or injury of the rectum.

According to the mother the boy seemed all right when he got out of bed to pass urine, so that much of the blood in the pleural cavity was probably the result of post-mortem bleeding. (Recently the floor of our mortuary was covered with blood from the arm of a corpse. The patient had been getting a continuous intravenous saline at the time of death and it was not thought worth while to close the vein.)

A CASE OF "PLEURAL SHOCK"

Death in this third case was very much more rapid than in the two women; it recalls very vivid memories of a death from "pleural shock" one of us (G. R. O.) had in 1927 when a house physician.

A woman of 26 had a pneumonia which had not resolved after a month. There were no definite signs of empyema, but general principles indicated that it should be looked for. A number of times over several weeks I explored her chest with a small Record needle attached to a 10 c.cm. syringe, having previously injected Novocain with a hypodermic needle. During these weeks the needle must have gone into her pleural cavity at least a dozen times with no ill effect. On the last occasion just as it entered she got a sudden fright and exclaimed, "Oh! I am going to die!" By the time I had replied, "no you are not," her pupils were fully dilated and her pulse had disappeared; no sound was heard over the heart but her breathing was regular and deep. Her sphincters relaxed and she died within 1½ minutes in spite of intracardiac adrenaline.

This case was left as one of the mysterious examples of "pleural shock," presumably caused by cardiac inhibition through the sympathetic system. The symptoms however were very much like those of the patients with air embolism and this seems the more probable explanation. In spite of the editor's statement that these mishaps might be avoided by more careful technique (*Lancet*, 1935, **2**, 1417) this case remains a nightmare with me for two reasons: (1) the technique used was that recommended by the editor, and (2) worst of all, I have no idea how to prevent it happening again. The steps I adopted however were: always to give morphia before the local anæsthetic (morphia is given on the assumption that the condition is of nervous origin); and to place much more reliance on physical signs.

CONCLUSIONS

Air embolism presents characteristic symptoms. These are sudden onset; disappearance of the pulse; deep respirations with air-hunger; restlessness with chest discomfort, shown especially by lashing about with the arms; pallor if the case is fatal in one or two minutes and associated with fright; and cyanosis if death is delayed.

A hissing noise of air entering a vein and convulsions were not observed.

At the autopsy the heart must be removed with the other thoracic viscera, and the right ventricle and pulmonary artery must be opened first. Some recommend opening the heart under water, but this is not necessary and has some disadvantages. Care must be taken to prevent air entering the heart through injury to a vein. If suspected the right ventricle should be opened before any organs are removed.

If the condition were recognised during life it is conceivable that aspiration of the right heart would avert a fatal issue.

REFERENCES

Coles, B. C., Richardson, H. F., and Hall, G. E. (1937) *Canad. med. Ass. J.* **36**, 24 and 584. Annotated in *Lancet*, 1937, **2**, 388.
Gough, J. A. (1924) *Surg. Gynec. Obstet.* **39**, 27.
Hamilton, I. (1936) *Med. J. Aust.* **2**, 789.
May, G. (1857) *Brit. med. J.* p. 477.

CARCINOMA OF THE TONGUE

LATE RESULTS OF TREATMENT

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THE early results of the cases of carcinoma of the tongue treated in St. Bartholomew's Hospital in the years 1920–29 were published in 1931 as part of an investigation into the value of Broders's histological classification as a guide to prognosis.[1] This series has now been followed to the end of 1937, so that the results are reported 8–17 years after treatment. Cases which died of intercurrent disease before the end of the five-year period, but which were known to be free of cancer at the time of death, have been omitted; there were only 6 of them. Cases which died of intercurrent disease after the end of the five-year period, but were known to be free of cancer at the time of death, have been included as "cured"; there were 9 such cases dying 8–13 years after treatment and 4 of these died from a second primary cancer. There are 15 cured patients still living 8–17 years after treatment. Another 12 who survived more than five years, but ultimately died of cancer, are of course not included in the cured cases.

TABLE I

Site.	Primary growth treated by—					
	Surgery.			Radium.		
	Cases treated.	Cases cured.	Per cent.	Cases treated.	Cases cured.	Per cent.
Anterior dorso-lingual ..	59	11	19	37	7	19
Inferior lingual ..	43	3	7	13	2	15
Posterior lingual .	3	1	33	8	0	0
Total ..	105	15	14	58	9	15

From this series (Table I) it appears that about 15 per cent of permanent cures of carcinoma of the tongue can be obtained, and that there is no significant difference between the results of surgical and radium treatment. Of the 139 cases which died of cancer of the tongue there were 12 which survived more than five years; the five-year *survival* rate in this series would thus be 22 per cent. The longest survival period was eleven years, and another case which survived nine years developed a second primary cancer in the mid-portion of the œsophagus.

TABLE II

—	Primary growth treated by—					
	Surgery.			Radium.		
	Cases treated.	Cases cured.	Per cent.	Cases treated.	Cases cured.	Per cent.
Without glandular metastases ..	48	13	27	15	6	40
With glandular metastases ..	57	2	3	43	3	7

[1] Phillips, R., *Lancet*, 1931, **1**, 118.

If the cases are subdivided into those without, and those with, clinical evidence of glandular metastases at the time of treatment, radium appears to have a slight advantage over surgery as judged from the percentage of permanent cures (Table II).

Unsuccessful radium treatment, however, is very much more unsuccessful than surgery if the post-operative duration of life is taken as the criterion. The post-operative duration of life after surgical treatment in the 90 cases which died was twenty-six months but only sixteen months in the 49 radium failures; the difference is greater in those cases without clinical metastases but is still several months in those with metastases (Table III).

TABLE III—POST-OPERATIVE DURATION OF LIFE

—	Primary growth treated by—			
	Surgery.		Radium.	
	Cases.	Months.	Cases.	Months.
Without glandular metastases	35	33	9	14
With glandular metastases	55	22	40	17
—	90	26	49	16

It is often supposed that the histological characters of the epithelioma can be used as a criterion in choosing between radium and surgery; since Grades III and IV in Broders's classification are more radiosensitive than Grades I and II, it is surmised that such growths will give better results if treated by radium, but that Grade I or II tumours are better treated by surgery. That such reasoning is incomplete is shown by Table IV and the erroneous grounds upon which it is based merit some discussion.

TABLE IV

Histological grade.	Primary growth treated by—					
	Surgery.			Radium.		
	Cases treated.	Cases cured.	Per cent.	Cases treated.	Cases cured.	Per cent.
I ..	14	2	16	4	2	28
II ..	37	6		21	5	
III ..	23	2	7	13	0	10
IV ..	5	0		6	2	

It will be seen that whether the treatment is by surgery or by radium the percentage of permanent cures in Grades I and II is more than double that in Grades III and IV. (All the 6 patients who died of intercurrent disease under five years had Grade I or II growths; the influence on the above figures had such accidents not occurred is obvious.) In the 1931 paper also, which was concerned only with the immediate results of radium treatment, the conclusion was reached that there was no relationship between the histological characters of the epitheliomata and their response to radium treatment. It is necessary to emphasise, however, that these cases were all treated by the interstitial method, and that similar conclusions would not necessarily hold for telecurie-therapy or for X ray therapy. Interstitial radium therapy is spatially limited in the same way as surgery, whereas external irradiation should be able to cover effectively the utmost extensions of the malignant process.

"RADIOSENSITIVITY"

The concept of radiosensitivity has long been of fundamental importance in the consideration of the biological effects of radiation. Since its first formal expression in the law of Bergonié and Tribondeau, abundant observations have confirmed the fact that immature and embryonic types of cell are more radiosensitive than fully differentiated and adult types. The concept of radiosensitivity can legitimately be used only in a relative, and not in an absolute, sense. The observations on which the concept is based are all of the same form—that one biological object suffers a certain injury from a smaller dose of radiation and in a shorter period of time than a second biological object with which it is being compared.

Having regard to this definition of radiosensitivity, it becomes clear that many extensions of the concept in the realms of clinical radiation therapy are illegitimate. For example, a high degree of radiosensitivity on the part of a particular type of malignant tissue as compared with other related types is by no means synonymous with a good prognosis for the patient bearing such a tumour. It is equally wrong to call a carcinoma of the rectum less radiosensitive than a carcinoma of the lip, unless it is known (1) that the same dose of radiation has been applied to each under the same conditions, and (2) that the repair powers of their respective supporting tissues are in all ways identical. The diminution in size of a tumour is sometimes due to the effects of the radiation upon the vascular and round-cell constituents of its stroma, and does not warrant its being called more radiosensitive than a similar tumour with a different stroma which fails to diminish in size from the same dose of radiation. As a last example, it is in general easier to cause the disappearance of a small tumour than of a large one, but this does not mean that the small tumour is more radiosensitive, for obviously both the effective dose of radiation and the reactive and reparative powers of the surrounding tissues here play an important part.

It is thus clear that the disappearance of a tumour or the statistical survival rates of patients are not such biological effects as can be related even qualitatively to the concept of radiosensitivity. Broders's histological classification of the epitheliomata shows a high degree of correlation with their clinical course, and it is agreed that epitheliomata which are graded III or IV in that classification are more radiosensitive than those graded I or II. It is then very frequently, but most illogically, assumed that the clinical course of an epithelioma treated by radium will be correlated with its radiosensitivity. Actually the prognosis of an epithelioma is equally correlated with its histological grade whether it is treated by surgery or by radiation! or, to put this statement in another form, surgery may be inadvisable in a Grade IV epithelioma because of the known rapidity and diffuseness of its growth, but radium is not contra-indicated in a Grade I epithelioma because of its relatively lower radiosensitivity.

MANAGEMENT OF CERVICAL GLANDS

The treatment of cervical glands is still an unsolved problem, and this series of cases is of little value as material since it is concerned only with interstitial radium, a method of great technical difficulty in this situation, which has in general been abandoned in favour of external irradiation.

Table V shows only a small advantage in favour of excision over conservative treatment, but when

the unsuccessful cases are considered the advantage becomes substantial. Thus the post-operative duration of life in cases having excision of glands which were not clinically malignant was thirty-nine months, as against only twenty months in those cases where

TABLE V—MANAGEMENT OF GLANDS

—	No treatment			Excision.			Radium.		
	Cases treated.	Cases cured.	Per cent.	Cases treated.	Cases cured.	Per cent.	Cases treated.	Cases cured.	Per cent.
Without glandular metastases ..	27	7	26	31	10	32	4	2	50
With glandular metastases ..	32	0	0	43	3	7	25	2	8
Total ..	59	7	12	74	13	18	29	4	14

conservative treatment was adopted; the corresponding figures for cases in which the glands were clinically involved are twenty-six and fifteen months respectively. Having regard also to the known difficulty of clinical assessment of glands, there seems no doubt that excision is preferable to conservative treatment. Whether external irradiation is preferable to excision, future statistics will show.

OCCURRENCE OF FURTHER PRIMARY GROWTHS

In this series of cases 4 developed a carcinoma of the œsophagus and 2 a carcinoma of the stomach some time after the primary growth in the tongue had been apparently cured; the œsophagus growths occurred twelve, nine, five, and one and a half years respectively after healing of the tongue growth, and the gastric growths nine and four years respectively. In addition, 2 cases developed a carcinoma of the palate eleven years and one year, and 1 case a carcinoma of the upper lip eleven years, after cure of a carcinoma of the tongue. These 9 cases of a second primary cancer represent about 5 per cent. of the total number of cases in the series; 6 of them occurred after the termination of the five-year period and amount to 20 per cent. of the number of cured cases. As regards the diagnosis of these cases, only 3 were proved by pathological examination (1 œsophagus, 1 palate, 1 upper lip); all 4 œsophageal cases showed the typical X ray appearances of a carcinoma in the middle-third of the œsophagus, while the 2 gastric cancers were clinically palpable and presented the typical symptoms and progressive course of that disease.

The ages of these patients ranged from 49 to 69 at the time of treatment of the first carcinoma in the tongue, and it seems as if there must often be a change in the mucous membrane of the whole upper alimentary tract which predisposes to carcinomatous development. Such a change may quite possibly be due to some deficiency factor analogous to that of the Plummer-Vinson syndrome, and would perhaps repay investigation.

SUMMARY

The late results of the treatment of 163 cases of carcinoma of the tongue show 15 per cent. of permanent cures. Treatment by interstitial radium has a slight, but not significant, advantage over surgical treatment in the percentage of cures, and the permanency of such cures is of the same order as in surgery. But in unsuccessful cases the duration of life after surgical treatment is some ten months longer than after radium treatment. There is no evidence that radium treatment is especially preferable in epitheliomata of anaplastic histological type, and fallacies are involved in the loose use of the concept of radiosensitivity.

The results in this series do not support the so-called conservative management of the cervical glands.

A fifth of the cured cases developed a carcinoma in some other part of the upper alimentary tract. The search for some causative factor, analogous to that of the Plummer-Vinson syndrome in the development of post-cricoid carcinoma, is suggested.

It is a pleasure to acknowledge my indebtedness to the cancer department of St. Bartholomew's Hospital (Dr. Malcolm Donaldson, director), and to the British Empire Cancer Campaign.

OSTEOMALACIA OF THE SPINE FOLLOWING THE ABUSE OF LAXATIVES

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LAST year Meyer and I wrote on osteomalacia of the spinal column caused by defects of nutrition.[1] After our paper was written another patient, suffering from a mysterious decalcification and collapse of the skeletal system, was referred to me. His case differs from the others in that no defect in the diet could be discovered.

CASE RECORD

History of illness.—A Swedish engineer, aged 71, was first admitted to Bispebjaerg Hospital on Nov. 2nd, 1936. About ten years previously, he said, he had begun to suffer from weakness and pain in the back. It was called "rheumatic pains" and his doctor ordered a restricted diet which gave him temporary relief, but the pain returned and became persistent. Three years ago when lifting something heavy he suddenly felt a "fracture" in the back; he said he actually heard the bone breaking. It caused him severe pain which became steadily worse. Radiography showed slight scoliosis of the lower part of the spine, with obvious decalcification and a slight wedge-shaped deformity of the 3rd lumbar vertebra. These changes were attributed to a fracture with secondary spondylitis deformans. A substantial leather corset and massage were ordered and six months later the patient went to Pistany, where he was treated with Gytje packs to the back. None of these measures, however, was successful; the pain persisted and the back collapsed more and more. He was provided with a new corset as the old one no longer fitted because his back had become shorter, and for this reason the corset had to be altered several times. For the relief of pain X ray treatment of the spine was tried in 1935 in Stockholm, but it did not help. Continuous and severe pain made it difficult for him to walk or even to lie in bed, and at this time he began to get tingling sensations in the legs and feet.

In the spring of 1936 another radiogram of the spine was taken and the report was as follows: "the 12th thoracic vertebra is compressed and its height reduced to half the normal. The 2nd and 3rd lumbar vertebræ are also compressed. There is extreme calcium deficiency in all the vertebræ." The radiologist said that there was "osteoporosis with compression of some of the vertebræ and slight spondylitis deformans." The collapse of the spine progressed throughout 1936 and the pain persisted. The patient believed he had become about 10 to 12 cm. shorter, and complained that the numb sensations in his legs and feet had increased. Up till this time he had

[1] Meulengracht, E., and Meyer, A. Rothe, *Acta med. scand.* 1937, 92, 584.

had three leather and three fabric corsets with iron supports, and he had also tried many anti-neuralgic remedies for the pain. In 1935 he took calcium and vitamin D in tablet form for a month and later he used ground-up egg-shells. He then started taking calcium in the form of calcium gluconate, 0·5 g. three times daily. From the beginning of 1936 he took, in addition, three tablets daily each containing 0·65 g. precipitated calcium phosphate, and vitamin D corresponding to about 1 g. of cod-liver oil, but he did not improve.

On admission his general condition was fair. The trunk was strikingly short and the back showed a flattened, somewhat stiff lumbar region with oblique and transverse folds of skin (see Figure). The costal margin rested on the iliac crest. Owing to the collapse of the spine the abdomen was slack and there were transverse folds of skin in the flanks, continuing down between the abdomen and the femora. The reflexes of the extremities were normal and there was no objective disturbance of sensitivity, but he complained of an unpleasant numb sensation in the lower limbs. The thyroid gland was not enlarged and the parathyroids could not be felt.

Radiological report.—"The patient refused to lie down, because he has great difficulty in getting up from the recumbent position, and as he was unable to keep perfectly still standing up and because our apparatus was not adapted for the standing position, the pictures were bad. The exceptional calcium deficiency contributed further to the bad results. The pictures show a row of coalescing vertebræ and a great number of hour-glass-shaped bodies. There does not seem to be one normally shaped vertebral body in the lumbar column, but in the thoracic region a few are normal though most are hour-glass shaped or fractured. The pelvic bones are also very halisteretic. On comparing the pictures with those which were taken in Sweden, one gets the impression that the calcium deficiency has progressed. It is suggested that the patient should be examined in the recumbent position (probably under narcosis). It would also be advisable to make comparative investigations of the long bones." At a further examination calcium deficiency in the cranium was demonstrated; a lateral view of the thoracic column showed a fair number of coalesced vertebral bodies with slight osteophyte formation in front and pronounced halisteresis. Apart from rarefaction the picture of the pelvis and knee regions showed nothing unusual. There were traces of osteophyte formation on the intercondyloid eminence.

Special investigations.—Serum calcium (two examinations): 10·2 mg. per 100 c.cm. and 10·3 mg. Serum phosphorus: 3·21 mg. per 100 c.cm. and 3·24 mg. Serum phosphates (Dr. Lundsteen): 65 units (upper normal limit). Total serum protein: 8·71 per cent. Blood sedimentation, 15 mm. in one hour. Icteric index, < 5. Hæmoglobin, 101 per cent.; red blood-cells, 5,140,000; platelets, 266,000; white cells, 3500 (polymorphs 68 per cent., monocytes 10 per cent., lymphocytes 21 per cent.). The histamine test gave an abundant secretion of gastric juice with a strong Congo red reaction:—

Time.	Volume (c.cm.).	Free HCl.	Total acidity.
9.50	17	5	25
10.10	32	65	92
10.30	38	84	100

The urine was free from albumin and Bence-Jones protein and the fæces did not contain an abnormal amount of fat. The blood-sugar curve after glucose administration was normal with a maximum increase to about 180 mg. per 100 c.cm. The systolic blood pressure was 120 mm.

Diet and laxatives.—The patient was questioned closely about his previous and present diet. He said that he had lived in Sweden all his life and that in his youth he had eaten exactly what he liked. About 35 years ago he began to restrict his diet, for fear of "gout"; he avoided red meat and meat soups, and ate only white meat and fish. For many years he drank very little milk, mainly because he did not like it, but he ate junket in the morning and evening when he could get it. He had been used to a rather rich diet and had plenty to eat and drink, but since he had been forced to stay at home his diet had not been so rich.

The above information showed that there was at any rate no serious defect in the patient's diet, which did not differ very much from the usual manner of living in Sweden. It appeared, however, that for years the patient had adopted a very unorthodox attitude regarding the action of his bowels. He explained that he had "always" suffered a little from constipation and had taken 1 teaspoonful of Carlsbad salts every morning for 35 years. This produced a soft or liquid evacuation 1½ hours later. In the last 12–16 years the patient had also visited a spa every year—Carlsbad, Marienbad, or Kissingen—where he underwent vigorous purging courses. He did not appear to have been subject to dyspepsia but was hypochondriac and obsessed by his evacuations.

The patient, showing the deformities resulting from skeletal collapse.

Treatment and its results. He was ordered to discontinue the Carlsbad salts and in its place paraffin oil and linseed (one tablespoonful of each) were given, and in addition a litre of buttermilk daily. He was also given thrice daily 3 tablets of 0·5 g. calcium sodium lactate, half a teaspoonful of calcium phosphate, and 20 drops of Ultranol (=2500 I.U. of vitamin D). The patient reported, at regular intervals, that the pain in the back was still present and that the paræsthesia in the extremities was becoming more troublesome. In order to relieve the latter, vitamin B_1 was tentatively prescribed. This did not help the condition, and the patient tried the introduction of some more steel supports in his corset.

I then lost sight of him till November, 1937 (that is, a year after the treatment had begun), when his doctor informed me that he had developed depression for which he had to be treated at an institution. This led to interruption of the treatment because the patient refused to eat. The doctor wrote however that after some months' treatment the decalcification had been arrested, although the X ray pictures did not show any increased deposit of calcium in the bones. But the coalescence of the vertebræ and the fragility of the ribs seemed to be at an end. He no longer wore a stiff corset, but only a light waistcoat, and could walk up and down stairs by himself. The doctor also said that it was his "personal opinion that the decalcification would have been arrested under continued treatment, if the psychosis had not developed."

COMMENT

We had thus to deal with a case of extreme decalcification of the bones manifested clinically by persistent and progressive pain in the back and loin, by spontaneous fracture and collapse of the spine, so that the patient became 10 to 12 cm. shorter, and by numb sensations in the lower extremities,

necessitating the use of bandages and leather corsets; and radiologically by an extreme calcium deficiency of the bones, especially of the spine, the vertebræ showing the typical hour-glass-shape ("fish vertebræ"), some of them having coalesced in an irregular manner. The picture corresponds accurately to the earlier described cases of osteomalacia of the spine, where the disease was undoubtedly caused by defects in the diet. Both the history and findings exclude the possibility of parathyroid disease or multiple myelomata. With regard to food the patient belonged to the most prosperous class, so that he was not obliged to live on an unbalanced diet for economical reasons. He had in fact lived "rather high," though his diet was to some extent restricted for fear of "gout"; and no reasonable explanation of the extreme decalcification of the skeletal system can be found in his diet.

The explanation must undoubtedly be sought in the manner in which for years the patient had "regulated" his bowels. He had taken one teaspoonful of Carlsbad salts every morning for 35 years, thus causing a soupy or liquid evacuation. These salts are mainly composed of sodium sulphate and sodium bicarbonate, and presumably a certain amount of the calcium of the food was transformed in the intestine into insoluble calcium sulphate which was then evacuated in the motions. The patient's condition thus resembles cœliac disease and sprue, in which a certain amount of calcium is precipitated in the form of calcium soap and therefore evades absorption, resulting in calcium deficiency of the skeletal system and osteomalacia. (I shall not discuss the question whether increased elimination of vitamin D also plays a part.)

SUMMARY

The calcium deficiency in a man who developed osteomalacia is attributed to the daily use for 35 years of Carlsbad salts which transformed a certain amount of his food calcium into insoluble calcium sulphate and thus prevented its absorption.

Clinical and Laboratory Notes

FOOT TROUBLE WITH NORMAL FEET

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Practitioners see a great number of patients complaining of pain, tiredness, "burning" and the like in their feet. Usually these symptoms are easily accounted for by obvious deformities or static and circulatory disturbances in the lower limbs. The routine treatment, if devised on individual lines, may be expected to be successful. But it is the few instances where examination of the limb does not reveal any evidence of such local cause which should put the doctor on his guard. Whenever the build and circulation of painful feet are apparently too "normal" to account for the complaints, one thing above all he should not do: dismiss the patient as a neurotic subject who, if poor, should not worry, if wealthy, should in addition take a holiday or go for a cruise. A brief survey of the following four patients I have seen in recent years may serve to illustrate a few of the many possibilities of mutual disappointment.

Case 1.—A man aged 23, of athletic build who had never before been ill, complained of tired feet. He had been treated elsewhere with supports, massage, and exercises for about two months. A radiogram showed no change. Clinically both feet appeared normal, but on taking an exhaustive history the one unusual thing he mentioned was that his feet were as tired in the morning as at night. Neurological examination revealed spastic reflexes, loss of sensibility, and a positive Babinski response in the right foot. Without going into detail I need only mention that the diagnosis—early disseminated sclerosis—was proved correct by fuller examination and the further development of the disease.

Case 2.—A girl of 17, rather stout and apparently in a state of high nervous tension, complained of pain in her feet and calves. Two pairs of supports had been given her by competent medical men but she felt no relief. She had none of the usual signs, but when palpating the calf muscles in a relaxed position they were found hard to the touch as if in a cramp and very sensitive. It was found that the girl, ashamed of her stout figure, had for the past few months practically stopped eating and had taken to excessive smoking. The diagnosis was subacute nicotine poisoning with a pathological increase of muscle tone especially in the lower limbs. During the next four weeks she followed a prescribed diet and cut down cigarettes to about five a day with the result that all pain disappeared. When seen six months later she was perfectly well.

Case 3.—A man of 55 for the last five years had been suffering from increasing pain in both feet. He had with him five pairs of supports all prescribed by medical men and had been treated for considerable periods with diathermy and massage. When asked about former diseases he protested that he had never been severely ill. This did not quite correspond with the impression he gave when entering the room breathing heavily, although he had been waiting for some time in a chair next door. His feet again were well built and showed no other indication of disease. But when palpating the right calf muscles there was an area soft to touch, somewhat sensitive, and not as freely movable as on the other side. In addition, the anterior border of the tibia felt very irregular and was sensitive. X ray revealed a classical example of tertiary bone syphilis of the tibia and a dense zone in the adjacent soft tissues due to a gummatous tumour the size of a fist. All the signs of aortic aneurysm were present. At last, when asked rather bluntly when he had had his last specific treatment, the patient came forward with a comprehensive story including even a course of malaria treatment following an attack of general paralysis. After six weeks' combined specific treatment the pain in the feet had gone together with the specific tumour. When seen a year later he was still free from pain and his heart condition had improved.

Case 4.—A man of 42 for the last four years had had burning pain in his feet. He had seen many doctors both in the United States and here. Some had given him the routine treatment without success, others had advised him to take a holiday. He had grown rather hostile to doctors in general and himself believed he was hysterical. His family life had even become affected by his restive attitude. It took some time until he agreed to see me shortly after I had operated on his daughter. Again the feet looked normal. A very extensive history was taken and three facts of considerable interest came to light. He had a "weak bladder" for some years and attacks of pain; recently he had great urgency when emptying his bowels and his sexual desire had diminished. Neurological examination showed spastic reflexes in both lower limbs, an irregular disturbance of sensibility up to the abdomen, and absence of the cremaster and abdominal reflexes on both sides. There was no Babinski response nor any other pathological reflex. The diagnosis of intraspinal tumour in the lower part of the upper thoracic region was proved correct by a contrast X ray. It showed nearly a complete "stop" between the 6th and 7th

thoracic vertebra. A tumour the size of a walnut has meanwhile been successfully removed by operation.

The four cases of foot trouble with normal feet proved to be disseminated sclerosis, subacute nicotine poisoning, tertiary syphilis, and an intraspinal tumour. The danger signal in all was the normal appearance of the feet. Extensive questioning and an examination not confined to the limbs helped to show the solution. The importance of early diagnosis is seen especially in the patient with a spinal tumour where operation was possible before paralysis or other serious effects of cord compression had occurred.

UNDULANT FEVER WITH SEVERE HÆMORRHAGE

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HÆMORRHAGE is a recognised though unusual feature of undulant fever. It was noted in about 5 per cent. of the 422 cases collected by Dalrymple-Champneys (1938), including 3 of the 12 that were fatal. Epistaxis was the commonest manifestation, but melæna, hæmoptysis, hæmatemesis, hæmaturia, menorrhagia, and bleeding from the gums also occurred, many of the patients showing more than one form of hæmorrhage. Bruce, describing the condition in 1889, included epistaxis, blood-stained sputum, and bleeding from the gums and from fissures in the tongue as clinical features of the disease. MacLeod (1897) reports how a naval officer invalided home from Malta died on board ship in three days from severe epistaxis, hæmaturia, and bleeding from the gums. Rogalski (1931) writes of a case in which hæmoptysis followed by blood-stained sputum suggested tuberculosis until the diagnosis was established.

The following case in a girl who has always lived in this country is recorded because of the severity of the accompanying hæmorrhage.

The patient, a healthy girl of 5 from a boarding-school in the country, was admitted to Archway Hospital on Dec. 30th, 1936, with a provisional diagnosis of acute bronchitis and tuberculous peritonitis. There was a history of cough and intermittent fever, up to 104·5° F., for three weeks. She had had two similar attacks, each lasting a fortnight, the first occurring two years before, after a camping holiday, and the second a year later. The other past illnesses were an inguinal abscess one year before and measles at the age of 2.

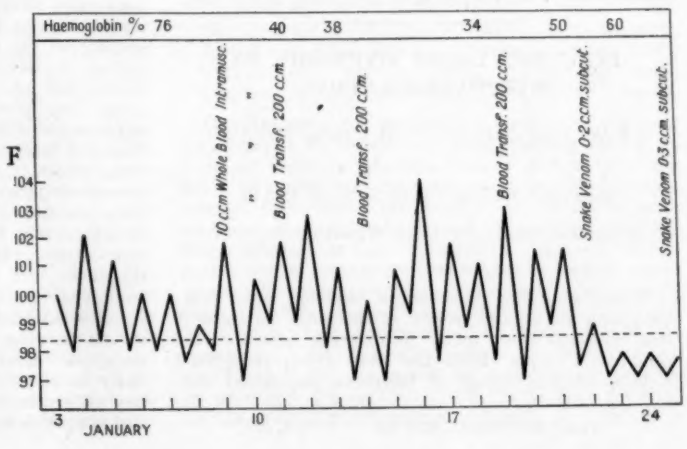
On admission the only symptoms were fever and slight cough; physical examination showed nothing abnormal except fine râles over the upper and middle zones of the chest. The blood count was as follows: red blood corpuscles, 5,890,000 per c.mm.; hæmoglobin, 82 per cent.; colour-index, 0·7; leucocytes, 5600 per c.mm. (polymorphonuclears 41 per cent., lymphocytes 55 per cent., monocytes 4 per cent.). The blood-serum showed agglutination with suspensions of *Brucella abortus* up to 1 in 160 dilution.

The fever continued (see Figure) and a week later bleeding began from the gums and lips followed by hæmorrhages into the mucosa of the tongue and mouth and petechiæ in the skin of the face, neck, and limbs; a needle-prick in the ear for blood examination bled obstinately for three days. Fresh crops of hæmorrhages appeared in the skin and hæmaturia began and

TABLE I

Date.	Organism.	Dilution. 1/20	1/40	1/80	1/160	1/320	1/640	1/1280	1/2560	Control.
1936. Dec. 28	Abortus.	++	++	++	++	−	−	−	−	−
1937. Jan. 12	„	++	++	++	++	++	−	−	−	−
	Melitensis.	+	−	−	−	−	−	−	..	..
„ 19	Abortus.	++	++	++	++	++	−	−	−	−
„ 23	„	++	++	++	++	++	−	−	−	−
	Melitensis.	+	+	+	−	−	−	−	..	..
March 3	Abortus.	+	++	++	++	++	−	−	−	−
Aug. 23	„	+	+	+	+	−	−	−	−	−
Dec. 23	„	−	−	−	−	−	−	−	−	−
	Melitensis.	−	−	−	−	−	−	−	−	−
1938. March 11	Abortus.	−	−	−	−	−	−	−	−	−

increased until the urine became dark red. The child rapidly became pale and collapsed. Two intramuscular injections of 10 c.cm. of whole blood from the mother were given without effect and the blood count fell as follows: red corpuscles, 1,830,000 per c.mm.; hæmoglobin, 34 per cent.; platelets, 18,000 per c.mm. Local applications of adrenaline to the nose and lips had no effect. A blood transfusion of 200 c.cm. was given, but severe bleeding from the nose and kidneys continued. Two further blood transfusions and three subcutaneous injections of snake venom (American water moccasin, *Agkistrodon piscivorus*) were given and the bleeding gradually diminished, ceasing finally after two weeks. At the same time the temperature returned to normal and the child's general condition began to improve. Further agglutination tests showed an increased agglutination with suspensions of *Br. abortus*, up to 1 in 320 dilution, and up to 1 in 80 dilution with suspensions of *Br. melitensis* (Table I). The quantitative absorption of agglutinins test on



the serum, carried out by Prof G. S. Wilson, gave the results set out in Table II.

TABLE II

Tested against—	Serum absorbed 1/10 with—	
	Abortus.	Melitensis.
Abortus	0	1/80
Melitensis	0	0

The result shows that *Br. abortus* can remove all agglutinins from the serum, whereas *Br. melitensis*, though it removes its own agglutinins and lowers the titre of those for *Br. abortus*, is unable to remove them all completely. The primary infecting agent is therefore probably *Br. abortus*.

A fortnight later the child complained of headache and cough and the temperature rose again to 104° F.; signs of broncho-pneumonia with coarse, dry râles appeared over the right chest; the spleen was not palpable. The attack lasted eight days but no bleeding occurred with it nor after the removal of an incisor tooth the following week. Large doses of iron were given and the blood count improved rapidly. The child was discharged on Feb. 27th, 1937, and has remained well since; there have been no hæmorrhages. The blood-serum continued to show a positive agglutination with *Br. abortus* on discharge and in August, 1937, but further examination in December, 1937, and in March, 1938, proved negative.

The school milk-supply was obtained mainly from a herd of goats, supplemented occasionally by raw cow's milk from a local dairy. So far as is known goats in this country have never yet been shown to be infected with *Br. abortus* and no case of undulant fever has definitely been traced to the consumption of goat's milk. There was no other similar illness in the school at the time, and it is possible that the child was infected during the camping holiday before the original attack of fever.

I have to thank Sir Weldon Dalrymple-Champneys for his help and advice and the medical staff of Archway Hospital under whose care the patient was admitted.

REFERENCES

Bruce, D. (1889) *Brit. med. J.* **1**, 1101.
Dalrymple-Champneys, W. (1938) Personal communication.
MacLeod, G. E. (1897) *Lancet*, **1**, 1410.
Rogalski, A. (1931) *Tunisie méd.* **9**, 515.

INDUCING LIGHT HYPNOSIS BY HYPERVENTILATION

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WHILE studying the changes resulting from over-breathing in a large series of neurotic patients it was noticed that many interesting effects were produced.[1] Apart from the more widely recognised tetanic effects, feelings of faintness, emotional outbursts, and a variable degree of clouding of consciousness were also common. In hysterical subjects especially, the most usual early finding was a loss of attentive powers and a significant increase in suggestibility. This was so definite in some of the patients that a hysterical trance state with subsequent amnesia occurred without any additional measures having been employed.

As a result of these observations we started to use hyperventilation as a simple means of inducing a light hypnosis. It is interesting that many hypnotists ask their patients to take deep breaths as an adjunct to other procedures, but we have found that hypnotic effects in many hysterical subjects can be produced by attention to the over-breathing alone. A darkened room, verbal suggestion, or elaborate ritual are not necessary in these cases. The method has the advantage of enabling the doctor to use it in an ordinary out-patient consulting-room, and, if necessary, in front of an audience. While this method may be inadequate for non-hysterical subjects, or those resistant to hypnosis, these limitations do not usually matter in the routine clinical and diagnostic practice for which this simple method is intended. The following is the technique:—

Without telling the patient he is to be hypnotised, he is asked to lie on a couch and to concentrate on breathing as deeply as possible, either in rhythm with the movements of the clinician's hand, or at some other command. This rhythm should be regular, and as rapid as is consistent with the patient's ability to take respirations of a maximum depth. With hysterical people it is rare to experience difficulty in getting them to persist in over-breathing. When some degree of gaseous alkalosis has been produced by two to four minutes of hyperventilation, the patient begins to feel dizzy and confused, and in hysterical subjects there is increased suggestibility. This can be rapidly gauged by the readiness with which the eyes follow a quickly moving finger, by a more automatic quality of the respiratory rhythm, and by increased willingness of response to requests to breathe deeply. A few other commands should now be given to test the degree of suggestibility present, and the patient is usually found to be in a state of light hypnosis. Questions may now be put to elucidate the psychogenesis of the illness, or therapeutic suggestions made, but regular deep breathing should be maintained throughout in order to retain the suggestive state.

During the past year this method has been used to confirm the diagnosis or to produce symptomatic relief in hysterical aphonia, paraplegia, or other conversion symptoms, and has been found especially useful in the investigation of hysterical amnesias coming to the out-patient department without any name or address. As with all such superficial treatments of hysterical subjects this does not imply any permanent benefit, and relapse or the appearance of fresh conversion symptoms is common. Three of our colleagues were impressed by the ease with which they could induce hypnosis in their hysterical patients by this method, though they had little previous experience in hypnotic technique. We therefore felt it worth while drawing attention to this adjunct to hypnotic practice because of its simplicity and the readiness with which it can be employed by ordinary clinicians. It must again be emphasised that failure generally attends attempts to use it upon any but suggestible subjects. The technique described is probably based on essentially the same mechanisms as any hypnotic procedure but differs from the usual methods in its emphasis and simplification.

[1] Fraser and Sargant, *Brit. med. J.* 1938, **1**, 378.

REVIEWS AND NOTICES OF BOOKS

Sulfanilamide Therapy of Bacterial Infections

By RALPH R. MELLON, M.D., Dr.P.H., D.Sc. (Hon.), Director of the Institute of Pathology, Western Pennsylvania Hospital, Pittsburgh; PAUL GROSS, M.D., Pathologist to the Institute; and FRANK B. COOPER, M.S., Research Chemist to the Institute. London: Baillière, Tindall and Cox. 1938. Pp. 398. 18s.

THIS is the first full-blown book to reach us on the new chemotherapy. It is based on 305 original papers, and is a complete enough account of progress up to about March, 1938: the preface is dated June 1st and a concluding chapter added at the last moment deals with six aspects of the subject on which further papers appeared during this interval. Although no subject could have been chosen on which a book is so likely to be out of date on its appearance, or at any rate a few weeks after, the value of this work is by no means ephemeral. Few are familiar enough with the history of sulphanilamide therapy to be able to understand its development. This account of the earlier researches is of permanent interest, and will serve as a foundation on which either these authors or others may build. The book contains a description of the authors' own researches into the mechanism of the action of sulphanilamide and its effect in experimental pneumococcal infections, together with some clinical observations bearing on the conclusions reached; these and their discussion indeed occupy considerably more space than the general review of the subject with which the book begins. Some of this writing, particularly the rather discursive concluding section on chemotherapy in general, might well have been condensed, and at times the authors seem to wander rather far from their main thesis in order to drag in something in which they are interested. This criticism applies particularly to Chapter 4 of Section III, which is really an essay on the measurement of "fitness" by estimating capacity for heat regeneration after chilling!

Throughout the book, whenever views are expressed on controversial aspects of chemotherapy, the other side of the case is presented fairly. The work thus provides a well-balanced survey from which anyone with more than a superficial interest in the subject will be able to fill the gaps in his knowledge without effort.

Hygiene

By J. R. CURRIE, M.A. Oxon., M.D. Glasg., D.P.H., F.R.C.P.E., Henry Mechan Professor of Public Health, University of Glasgow. Edinburgh: E. and S. Livingstone. 1938. Pp. 324. 15s.

LAST year Ireland supplied a short but comprehensive manual on preventive medicine suitable for the medical student. Now Prof. J. W. F. Bigger's excellent book is matched by an equally satisfactory volume produced in Scotland. Both authors have taken the English practice as the standard; Prof. Currie has added small print notes on Scottish practice where it differs from this standard. The general plan of his book is to trace first the relation of the social services to the individual from inheritance and infancy through life to old age; after chapters on public health administration, vital statistics, and food, we pass to environmental hygiene and the community diseases and finish with a section on international health relations. It is a grim comment on the times that this last chapter should contain a summary of air-raid precautions and defence against lethal gases.

The errors of fact are so few and so trivial from the student's point of view as to be almost negligible. For example, though it is not true that the medical inspection of school-children has been "virtually made over from the Board of Education to the Ministry of Health," this transfer was at one time intended; it was, however, never effected, the only link being a chief medical officer common to both services. In the same section the impression is given that pathologists to venereal diseases clinics and public assistance medical officers are the only part-time doctors in the public services. Even among medical officers of health the proportion is numerically still in favour of the part-time officer. Vaccination against yellow fever is happily no longer "too involved for general use": over 300,000 persons have been immunised by mass vaccinations in Brazil, and it is in that country and not Colombia that "jungle yellow fever" has been recognised in aedes-free districts. It is the ulcero-glandular and not the typhoidal type of tularæmia which occurs from handling the affected rodent. We draw attention to these points because a second edition is almost certain to be called for soon.

The selection of material in any book of moderate size on a huge subject is a matter of personal preference. The various sections here chosen cover the field well and their high quality is maintained throughout; particularly good chapters are those on inheritance, mental hygiene, food, and international health relations. A single short paragraph on bacterial pollution of water and water-borne outbreaks of disease seems inadequate, nor are the dangers of domestic water filters sufficiently emphasised. The section on community diseases might have been shortened by confining the description of each disease, except the rarer tropical ones, strictly to ætiology and prevention: for example, it is not to his hygiene text-book that a student should turn for the symptoms and signs of tuberculosis and typhoid fever. The illustrations throughout are clear and well chosen; some graphs and histograms would have improved the section on vital statistics.

This book deserves success and should achieve it, for teachers will approve its content and students will find it easy and pleasant to read.

The Ship Surgeon's Handbook

By BRYCE J. MACAULAY, M.D., late Surgeon, Royal Mail Steamship Co.; Surgeon, United Baltic Corporation. Bristol: John Wright and Sons; London: Simpkin Marshall. 1938. Pp. 66. 3s. 6d.

Dr. Macaulay has produced a little book that will be of use to those who are contemplating taking up duty as ships' surgeons. Parts 1 and 2 (covering some 19 pages) give information in concise and convenient form about the routine and duties of work on board ship, quarantine, and the application of the International Sanitary Convention. A good section is devoted to sea-sickness, a distressing malady about which the recent medical graduate usually knows very little. For the same reason fuller details about the fumigation and disinfection of ships would be welcome. The appendix operation described on pp. 21–24 is not the easiest for a novice, nor is it up to date and the account given would bear revision. In the section on strangulated hernia no mention is

made of bathing the bowel with warm saline to test for viability. In the list of instruments given as necessary for a trephine operation artery forceps are omitted. No mention is made of the simple method of giving intravenous saline by running it through a hypodermic needle into a vein. But these omissions would be easily remedied in another edition, and the book as it stands has merit.

British Encyclopædia of Medical Practice

Vol. VIII. By Various Authors. Under the general editorship of Sir HUMPHRY ROLLESTON, Bart., G.C.V.O., K.C.B., M.D., D.Sc., Emeritus Professor of Physic, Cambridge. With the assistance of Prof. F. R. FRASER, M.D., F.R.C.P.; Prof. G. GREY TURNER, M.S., F.R.C.S.; Prof. JAMES YOUNG, D.S.O., M.D., F.R.C.S.E.; Sir LEONARD ROGERS, K.C.S.I., F.R.C.P., F.R.C.S., F.R.S.; and F. M. R. WALSHE, O.B.E., M.D., D.Sc., F.R.C.P. London: Butterworth and Co. 1938. Pp. 702. 35*s*.

WITH the present volume, which opens with Dr. Janet Vaughan's clear account of the leukæmias and ends with a summary of Sir Arthur Hurst's views on mucous colic, the editors reach the end of the first part of their task. Medicine and the law is the subject of three important contributions. In the first of these, W. A. Brend discusses the medical witness; he attributes to fundamental differences between the medical and legal approach to a problem the fact that the doctor so often figures to disadvantage in the law court. Even at the cost of being labelled a "bad" witness, however, he can only help the court, which is what he is there for, by refusing to sacrifice accuracy to expediency. D. C. Norris's two articles on medico-legal examinations and malingering are no less instructive. The malingerer, unlike the neurotic, "consciously and purposely" feigns illness; in the words of Lord Justice Buckley, he is "not ill, but pretends that he is." But the diagnosis of malingering may, as every doctor knows, be a matter of great difficulty and according to Dr. Norris the medical witness may properly leave to the court the decision whether or not a claimant is a malingerer. Among the eleven articles on diseases of the liver is a short but adequate account by R. S. Aitken of the various tests of liver function, which he not only describes but also interprets and evaluates. The plasma phosphatase determination, the bilirubin estimation, and the galactose-tolerance test are regarded as the most useful for clinical purposes. The nine articles on lung diseases include an exhaustive discussion of the various modern methods of treatment of pulmonary tuberculosis by L. S. T. Burrell, and a joint contribution by Maurice Davidson and A. Tudor Edwards on the medical and surgical aspects of lung abscess and gangrene. In William Gunn's account of measles, reference is made to the recent work of McKhann and others who have prepared immune serum from fresh placentæ. The potency of these placental extracts is intermediate between that of convalescent and adult serum, but their tendency to provoke febrile disturbance and local reactions is an objection to their use. The intramuscular or intravenous injection of ergotamine tartrate during attacks of migraine is advocated by E. A. Carmichael, who has little faith in the prophylactic value of nitroglycerin between attacks. Those perturbed by the exaggeration of the dangers of childbirth in the public press and elsewhere will be reassured by Sir Arthur MacNalty's sane notes on this subject. He points out that the number of deaths attributable to parturition is small compared with that from many other causes of death in England and Wales, and does not amount to 8 per cent. of the total deaths from all causes among women of childbearing age. He reminds us also that the puerperal mortality-rate overstates the hazard to life in that it includes not only deaths due to abortion but also those occurring during pregnancy and before parturition. Sir Arthur does not suggest that efforts towards further reduction in maternal mortality should be relaxed. An adequate obstetrical consultant service, the provision of emergency units, full coöperation between general practitioners and local maternity services, and the provision of further suitable maternity accommodation, including a sufficient number of beds for antenatal cases, may all contribute to this end. Few practitioners will deny that all these measures would be useful with the proviso that, if antenatal examination is to achieve the best possible results, it should be carried out by the doctor who will be called upon to attend and deal with any difficulty arising during the confinement.

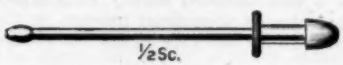
The "British Encyclopædia of Medical Practice" has maintained the high standard of its early volumes and is especially commended to those without easy access to reference libraries.

THE proceedings of the Congresses on Rheumatism and Hydrology held in the spring at London, Oxford, and Bath have now been issued in an attractive volume (London: Headley Brothers. 1938. Pp. 362. Price 12*s*. 6*d*.). The presidential addresses of Sir Farquhar Buzzard and Lord Horder appear in full and the papers submitted are reproduced in one or other of the three languages current at the congresses, accompanied by short précis in the other two languages. The format, accuracy, and illustrative material leave nothing to be desired.

NEW INVENTIONS

PLACENTAL CANNULA

THIS is a simple cannula designed for introduction into the umbilical vein after division of the cord at birth to enable saline to be injected into the placenta in cases of retained placenta. The method is always worthy of trial if the patient is not bleeding freely, since it may obviate the more dangerous operation of manual removal. The size of the cannula has been



arrived at from experiments on large numbers of cords and is fitted with a shoulder over which the cord may be tightly tied, leaving a nipple to which tubing may be attached connecting it to a bladder or Higginson syringe. Usually 500 c.cm. or more of saline are injected.

The cannula is made by Messrs. Willen Bros., New Cavendish-street, W.1.

P. M. G. RUSSELL, M.B., M.C.O.G.
Assistant in the Obstetric Unit, University College Hospital.

ENDOVESICAL PHOTOGRAPHY.—Dr. Ernst Sklarz asks us to state that with the new apparatus which he described in our last issue (p. 728) photographs can be taken while the interior of the bladder is being observed.

FOREARM TRACTION MACHINE.—Dr. M. S. Holman informs us that his invention described in our issue of Sept. 17th can be obtained from the manufacturers, Philip Harris and Co. Ltd., Edmund-street, Birmingham.

THE LANCET

LONDON: SATURDAY, OCTOBER 1, 1938

NATIONAL ANXIETY

THE anxiety which oppresses us to-day recalls the early days of August, 1914, but the perspective is altered by the greater probability of aerial attack which now brings danger to every home. In these times the first thought will be to ensure as far as possible the safety of the nation's children, of pregnant women near term, and of mothers with young infants. And by safety all people with imagination mean not only removal from the more obvious risks of gross physical damage but from sights and sounds which may leave a lasting terror in young minds. Proposals have been put before London parents this week for the emergency evacuation of children attending council schools. They would be billeted at the expense of the State with foster-parents in the country, where their schooling would as far as possible be uninterrupted. Probably the main anxiety of the lonely parents would be about the arrangements to be made for their children if they were ill. This might in some measure be relieved by the assurance in advance either that they would be under supervision by the doctors and nurses of the district of refuge, or that some of the school medical and nursing service would be seconded for this purpose. Mothers reluctant to be separated from their children might decide to risk keeping the family together in town and possibly to join them later, though they have been warned that this may be impossible during the first few days of an emergency. It is those who are expecting another child who may have most difficulty in reaching a decision, for their condition may well diminish their chances of finding accommodation in the country. A billeting scheme sufficiently elastic to include care during confinement may be difficult to devise, but is imperative unless pregnant women who have booked beds in institutions in large towns, or have arranged for domiciliary attendance, are to be left stranded at a time when they most need help.

It is generally agreed that if aerial attack were imminent the London teaching hospitals would evacuate their beds and become casualty stations. Other hospitals in town and country are ready to clear as many beds as they can by admitting only acute cases and sending to their homes convalescents who no longer urgently require expert attention. The dispersal of chronic and bedridden patients would raise a difficult problem, for such patients obviously require fewer attendants in an institution than the same number would need if distributed in their homes. As far as London is concerned, the Emergency Bed Service, besides continuing its normal work of helping doctors to place acutely ill patients, will be at the disposal of those responsible for allocating casualties during air raids. We understand that certain hospitals are to be reserved for military casualties, while injured civilians would be placed elsewhere.

The tremendous call on medical resources arising in an emergency was foreseen by the British Medical Association when about a year ago it responded to an official request for a list not only of those prepared to offer whole-time services at home or abroad but of volunteers for emergency purposes in any part of the country. The questionary then circulated has within the last few days been sent out again to those who did not reply and to all who have since had their names placed on the Medical Register. The individual returns were made under pledge of being confidential unless a situation were to arise necessitating general mobilisation and embodiment of the Territorial Army. Doctors may reasonably now be asked to make an open statement of their intentions, in order that they may learn where and in what capacity their services may be required (see p. 809). Come what may, medicine will carry on its accustomed task of ministering to the health and, if need be, to the sufferings of humanity.

THE PROBLEM OF CHRONIC RHEUMATIC DISEASES

WITH the merging of the committee on rheumatic diseases set up by the Royal College of Physicians of London in the Empire Rheumatism Council, the series of reports issued by the former committee comes to an end. It is to be succeeded by a journal issued six-monthly by the Council's scientific advisory committee. To the new publication we offer a welcome in advance, hoping that it will do much to stimulate not only the acquisition of fresh knowledge but the energetic application of that which we already possess about rheumatism in its various aspects. It would be ungrateful not to acknowledge once again the debt we owe to the British committee for its labours and for the reports of which the fourth and last is by no means the least important.[1] More than half of it is occupied by papers on treatment. The most substantial piece of original work is a controlled test of gold therapy carried out by Dr. PHILIP ELLMAN and Dr. JOHN S. LAWRENCE. They took about 60 patients suffering from "typical rheumatoid arthritis," who were showing little or no response to treatment by physical methods. To a third of them they gave Solganol B in weekly intramuscular doses, rising to 0·2 g. in a dose and 2·5 g. for the course. To another third they gave gold by the same method but in smaller dosage, sometimes prolonging the course. The remaining third, who attended the same sessions of the same clinic, were used as controls, receiving intramuscularly only almond oil. The course of the disease was assessed by observation of the patients' complaint of pain, of the measured amount of swelling of

[1] Chronic Rheumatic Diseases, being the fourth annual report of the British Committee on Chronic Rheumatic Diseases appointed by the Royal College of Physicians. Edited by C. W. Buckley, M.D., F.R.C.P. London: H. K. Lewis and Co. 1938. Pp. 160. 10*s.* 6*d.*

the smaller joints, and of the blood sedimentation-rate. In the control group of 20, over a period of nine months 1 patient lost all signs and symptoms of disease, 13 suffered less pain, and 6 noticed no change; these observations throw light on the natural behaviour of the disease. In the gold-treated groups, however, the proportion of improvements and apparent cures was distinctly higher. When the careful measurements of the circumferences of swollen joints in the three groups were averaged and charted, the gold-treated cases showed a small but progressive decrease and the controls little change. Similarly the blood sedimentation-rates in the gold-treated groups usually fell, especially in the group receiving larger doses, and often reached normal; in the control group they showed on the average little change. These findings have been obtained by much patient toil, and they are welcome as carefully weighed and controlled evidence in support of the claim that gold can, somehow, influence the course of rheumatoid arthritis. In the course of their work, ELLMAN and LAWRENCE noticed that when the severer toxic manifestations occurred (stomatitis, exfoliative dermatitis, agranulocytosis) they did so after the blood sedimentation-rate had fallen to normal levels. This observation, if borne out by wider experience, may be of great importance, for if by watching the sedimentation-rate and greatly reducing the dose of gold when it approaches normal those toxic effects can be forestalled, gold therapy will have been robbed of its terrors. Attention is drawn to another possible "halt" sign of danger ahead by Dr. C. TRIST GASKING of Harrogate. He shows that the first dose of gold regularly causes a sharp fall in the blood-platelet count, most pronounced on the third day; subsequent doses cause much smaller falls, but in some patients the effect is cumulative and, especially in those whose initial count has been low, the degree of thrombocytopenia usually associated with hæmorrhage may be reached. Development of the hæmorrhagic state being one of the well-known forms of gold intoxication, GASKING suggests that thrombocytopenia may contribute to it, and that scrutiny of platelet counts may give warning of its approach; his own experience of such toxic effects, however, has not been great enough to enable him to test its value. Other communications on treatment include an examination of the value of vaccine therapy in rheumatism by Dr. E. C. WARNER, who sums up against vaccines in acute rheumatism but, largely on a priori grounds, holds them worthy of further trial in rheumatoid arthritis; an account of radio-active substances used in the treatment of rheumatism, dealing chiefly with their untoward effects, by Dr. M-P. WEIL and Dr. FRANCIS BACH; a lukewarm note on bone-drilling in arthritis by Dr. G. D. KERSLEY; and a description of the physiological action of some methods of physical treatment by Sir LEONARD HILL, F.R.S., and Dr. H. J. TAYLOR. Dr. PHILIP HENCH, who contributes his usual succinct and critical summing-up of the year's work on rheumatism in the United States, has no notable advance to record. Prof. W. M. MITCHELL of the Royal Veterinary College in Edinburgh gives an interesting account of "rheumatic disease" in the horse, in which animal osteo-arthritis both of spine and of limb-joints seems very common. From the symposium on sciatica which we reported some months ago [2] three papers are printed: Dr. DENIS BRINTON, as an uncompromising neurologist, defines sciatica as pain due to interstitial inflammation of the sciatic nerve or its roots, and gives a good short account of sciatic neuritis; Dr. ARTHUR WESSON on the other hand applies the term "sciatica" to any pain approximating to the course of the sciatic nerve, and attributes most cases to pathological processes in the muscles, ligaments, and joints of the lumbar, sacral, and iliac regions, whose clinical features and treatment —largely orthopædic—he describes; Dr. KERSLEY comprehends both points of view.

We mention last the first paper in the volume, which strikes at the root of the medico-political question whether the voluntary hospital system can solve the problem of rheumatic disease. Prof. L. S. P. DAVIDSON and Dr. J. J. R. DUTHIE make a rough computation of the number of new cases of rheumatic disease arising annually in Scotland, and a rough assessment of the equipment and personnel available for treating them. The contrast between the two figures is pathetic. The authors conclude that the voluntary hospitals are unlikely to be able, even if willing, to provide the beds, the apparatus, and the properly trained physicians necessary to treat these tens or hundreds of thousands of patients. Nor do they see any hope that the British spas can provide what is needed. The only solution, in their view, is the establishment of new rheumatism centres up and down the country, in the charge of full-time specialists and staffed by full-time and part-time workers, for whose proper training a special post-graduate school or schools of rheumatology will have to be set up. The authors suggest that though only national or municipal authorities could possibly finance such a scheme, the cost would be small enough in comparison with the estimate of £20,000,000 said to be the annual economic cost to the country of the rheumatic diseases. Wherever bed accommodation is provided it should be accessible to medical students. At long last clinical teachers throughout the country have become convinced that palliative measures applied in time will relieve pain and mitigate disability even though we still lack means either to prevent or to cure chronic rheumatic disease. It would be a calamity if through their segregation the new generation of medical men in their most impressionable years should continue to lack the spur of close daily contact with these unfortunates.

AIR EMBOLISM

AIR embolism is one of the rarer, and often one of the more mysterious, causes of acute collapse; it may occur in the practice of physicians, surgeons, or gynæcologists. Two distinct groups of cases can be distinguished. In the first, to which

[2] See *Lancet*, July 30th, 1938, pp. 260, 266.

belong the cases reported by OSBORN and DAWSON on another page, air enters a systemic vein and is carried to the right side of the heart and the pulmonary artery, obstructing the pulmonary circulation and giving rise to symptoms of acute right heart failure, similar to those due to massive pulmonary embolism from any other cause. In the second group, air enters a pulmonary vein, passes to the left side of the heart and thence into the systemic circulation; here the most striking symptoms are usually those due to obstruction of cerebral vessels, but air has been observed in the retinal arteries by ophthalmoscopy,[1] and multiple areas of blanching of the skin have also been recorded.[2] In the first group the air embolism usually arises from conditions affecting the gravid uterus. It may be a complication of delivery at term, or Cæsarean section, as in one of OSBORN and DAWSON'S cases, or it may follow abortion, especially when induced by injections of various sorts. Attention has recently been drawn [3] to the danger of air or fat embolism after intra-uterine injection of Leunbach's paste, fatalities having been reported both from America and from Germany. COLES, RICHARDSON, and HALL [4] have questioned whether air embolism is the sole cause of death in cases of this sort, pointing out that if air could get into the uterine veins the injected fluid or paste (often toxic) could also gain entrance into the circulation. Air embolism has also been reported as a complication of operations involving the great veins of the neck and the intracranial venous sinuses, after irrigation of the maxillary antra or of the peritoneal pocket of a subphrenic abscess, and after intravesical air injections. In most of the second group the embolism occurs in the course of artificial pneumothorax, but it may complicate any needling of the chest, operations on the lungs, especially for lung abscess, or even irrigation of an empyema cavity. Several examples were recently reported to the Société Médicale des Hôpitaux de Paris. WEISMANN-NETTER [5] was refilling a right-sided pneumothorax which had been present for eighteen months; just after the introduction of air had begun the patient complained of pain in the region of the needle-puncture, and the needle when removed was found to contain blood. The patient became pale, with a feeble pulse and a feeling of constriction behind the sternum; this was followed by left homonymous hemianopia, and tingling, numbness, and weakness of the left hand. These symptoms cleared up after four or five minutes, and soon afterwards the man had a small hæmoptysis. About seven hours later there was a transitory return of the same symptoms, but eventually recovery was complete. BERNARD and KREIS [6] attempted to re-establish a pneumothorax which had re-expanded eight years previously. Three small insufflations of air under high pressure had been made; at the fourth, after 75 c.cm. had been injected, the air-pressure was suddenly increased, when the patient's face and right arm began to twitch. He became stuporous and developed a left hemiplegia and left homonymous hemianopia with a patchy erythema on the skin. These symptoms and signs all disappeared within an hour. The notes of most cases in this group record pleural adhesions, excessive pressure in the pneumothorax, or a wound in the lung. This, with the fact that similar accidents follow simple needling, makes it probable that damage to the lung either by the needle or by rupture of a small adhesion is an essential step in their production; once a communication between the air-passages and a small pulmonary vein is made air can flow into it, since the pressure in the pulmonary veins is subatmospheric at any rate during inspiration. Another point worth noting is that the site of a cerebral embolism depends to some extent upon the position of the patient; if he is on his right side, paresis is usually left-sided, and vice versa.

VILLARET and CACHERA [7] have studied the effect of air injected experimentally into the systemic and pulmonary circulations, making observations on the vessels of the cerebral cortex through a window in the skull. The injection of as little as 5 c.cm. of air into the pulmonary vein of a dog produced visible air embolism in the cerebral cortical vessels. When they injected air into a systemic vein they observed cerebral embolism directly in only 1 out of 32 animals, even with a much larger injection; but careful post-mortem examination revealed some air in the left side of the heart in a third of the animals. The author verified the integrity of the interauricular and interventricular septa, and concluded that the pulmonary vessels did not always offer an impenetrable barrier to the passage of air. As might have been expected they observed pressure changes characteristic of acute right heart failure in all animals subjected to intravenous injections of air: a fall of systemic arterial pressure with gross increase in the venous pressure, and at autopsy gross distension of the right heart and great veins which contained a frothy mixture of air and blood, while the left heart was almost empty.

The differentiation between air embolism and "pleural shock" in cases of collapse during needling of the chest remains a matter of controversy.[8] CAPPS holds strongly to the opinion that most cases are due to pleural shock [9]; but there have now been far more reasonably authenticated cases of air embolism than cases of sudden death during needling of the chest which could be attributed to that ill-defined condition. It should not be forgotten that simple fainting attacks may follow needling of the chest, as they may even such a simple procedure as vein-puncture, and these should not be dignified with the label pleural shock.

[1] Reyer, G. W., and Kohl, H. W., *J. Amer. med. Ass.* 1926, **87**, 1626.
[2] Walker, V. R., *Lancet*, 1933, **1**, 636.
[3] *J. Amer. med. Ass.* August 6th, 1938, p. 535.
[4] Coles, B. C., Richardson, H. F., and Hall, D. E., *Canad. med. Ass. J.* 1937, **37**, 24; *Lancet*, 1937, **2**, 388.
[5] Weismann-Netter, M. R., *Bull. Soc. méd. Hôp. Paris*, June 6th, 1938, p. 947.
[6] Bernard, E., and Kreis, B., *Ibid*, June 27th, 1938, p. 1071.
[7] Villaret, M., and Cachera, R., *Ibid*, p. 1093.
[8] *Lancet*, 1935, **2**, 1417.
[9] Capps, J. A., *J. Amer. med. Ass.* 1937, **109**, 852.

FAMILY ALLOWANCES

THE enormous strain placed on the resources of a family of small means by three or more children was the theme of an address given last week by Sir ROBERT KINDERSLEY, president of the National Savings Committee. With wages based on the type of employment and the grade of the worker within his occupation, every additional child means a lowering of the standard of living, in a material sense, for the family as compared with others similarly earning. Consequently the children in such households suffer most from poverty and malnutrition; they pay the penalty of their parents' procreativity. The time is past when procreation at any level of society can be condemned as improvidence, unless we are content to see the race move at an accelerated pace to extinction. Sir ROBERT commended the example of a firm in St. Helens, Lancs, which pays allowances for children in addition to the ordinary wage. In a pamphlet [1] published by the Family Endowment Society, Miss GREEN gives a concise account of the general measures of this kind already adopted in France, Belgium, and Italy, in New South Wales and New Zealand, and also of a few occupational schemes in England. She mentions, further, that family allowances are paid in some occupations in Germany, Holland, Luxembourg, Poland, Switzerland, Hungary, Czechoslovakia, and Jugoslavia. It appears that none of the workers' organisations in countries which have experience of the scheme believes that the total income going to their members has been reduced. At any one time only a small percentage (actually about 5) of the workers in this country have dependent children, and it is suggested that an allowance for each of them would not be an impossible burden for either industry or the State. Miss GREEN'S argument is that the future adults are the human capital of industry, and industry or the State should husband it not only by social services but also by a redistribution of wages as family allowances in proportion to the number of persons they have to maintain.

The proposal seems more practicable, and more in conformity with the modern attempt to correlate income with needs, than the idea underlying Mr. J. KUCZYNSKI'S calculations [2] that every man over 21 years of age should have an income big enough to support a wife and three children whether he has them or not. Clearly, however, the estimate of needs would have to be less exiguous, in times of peace, than that provisionally made by Mr. SEEBOHM ROWNTREE last year [3] in support of his argument not for family allowances but for a minimum wage. The lack of any agreement on what is meant by a standard of living and on the means of measuring it is discussed in a recent report from the International Labour Office.[4] The report points out that while subjective satisfactions have an important bearing on the adequacy of living conditions, they are not readily measurable. Comparisons have, therefore, to be confined to items of an objective character—viz., (1) the level of consumption, or the composite of goods and services of a specific quantity and quality consumed by an individual family or group within a given period; (2) social services and free services, particularly those which relate to health, education, and recreation; and (3) working conditions which affect not only the worker's health and earning capacity but also the size and regularity of his income. On such items a large amount of information exists, but it is heterogeneous and considerable gaps remain to be filled in all countries before an adequate picture can be drawn. At present there is danger in making comparisons as between different times or different national groups or different countries. As a practical scheme it seems logical for the purposes of social policy to establish "norms of consumption"—i.e., for nutrition, housing, clothing, &c.—on the basis of expert opinion, and apply them to the preparation of standard budgets, so setting up national minima at different levels—comfort, decency, and subsistence.

ANNOTATIONS

LEGAL REPRESENTATION OF MEDICAL MEN AT INQUESTS

THERE is a class of inquest which is held because allegations of carelessness in treatment or error in diagnosis are, through misunderstandings on the part of the household or gossip on the part of the neighbours, made against the medical attendant of the deceased. The coroner is obliged to intervene and investigate. Occasionally substance is found in the complaints; but far more often, after hearing the evidence and particularly the disinterested testimony of the pathologist's report, the members of the dead man's family express themselves as entirely satisfied that nobody was to blame. Thus the public is reassured, though at the cost of grave anxiety to the medical practitioner, whose professional reputation was placed in issue. When he received a summons to attend the court, he would be aware that he was likely to be cross-examined in unfamiliar and possibly unfriendly surroundings by somebody who is doing his best to find material for charges of negligence. It would not be surprising if, with this prospect in view, the practitioner sought in his helplessness to enlist the help of a legal representative at the inquest.

It is an old saying in the legal world that a man who is his own lawyer has a fool for a client. Experts nevertheless advise that, in the case of a medical man whose professional work is likely to be challenged in a coroner's court, he does better to stand upon his own feet than to lean for support upon a legal representative whose opportunities of advocacy will be severely restricted by the procedural traditions of an inquest. The report presented on Tuesday to the

[1] Family Allowances. By Marjorie E. Green. The Family Endowment Society, 72, Horseferry-road, London, S.W.1. 1938. 6d.

[2] Hunger and Work. By Jürgen Kuczynski. London: Lawrence and Wishart. 1938. Pp. 132. 3s. 6d.

[3] See *Lancet*, 1937, 1, 1411.

[4] The Worker's Standard of Living. Studies and Reports, Series B (Economic Conditions) No. 30. The International Labour Office, Geneva. London: P. S. King and Son. 1938. 2s.

annual meeting of the Medical Defence Union remarks that this question of representation at inquests always requires careful consideration because the fact that a medical man has thought it best to be represented may suggest the idea that he is on his guard and has reason to fear criticism. The Union's solicitors state that they are disinclined to advise representation "unless there are real grounds for believing that an attack may be made with which the coroner unassisted is unable to deal." It must indeed be an exceptional case when the coroner cannot control his court single-handed.

MEDIASTINITIS

THE mediastinum has not long been included among the regions open to surgical treatment. It is so inaccessible that even when the services of an expert team—radiologist, anæsthetist, and surgeon—are available it is only possible to deal with localised inflammations. Unfortunately loose connective tissue does not favour the formation of any protective barrier, and inflammation when it begins usually spreads quickly. From a study of 60 cases of acute and chronic mediastinitis Keefer [1] concludes that diffuse phlegmonous mediastinitis is too rapidly fatal to be amenable to operation, but that localised abscesses, which may involve either the anterior or more commonly the posterior mediastinum, often demand surgical intervention. They are always secondary, and their diagnosis depends therefore on the history of a condition which is capable of causing them. In Keefer's series acute anterior abscess arose from infections of the neck, larynx, sternum, or lung, and posterior abscess from perforation of the œsophagus or suppuration of lymph nodes. It is essential to learn the paths of extension of such infections and to recognise the X ray appearances of localised ones. Among symptoms pain is conspicuous. In abscess of the anterior mediastinum it is usually substernal and throbbing, while in posterior abscess it is felt on swallowing and coughing, and may radiate from between the shoulder-blades forwards along the intercostal nerves. The series also included 3 cases of chronic abscess, all tuberculous, and 9 of chronic diffuse mediastinitis, 4 of which were syphilitic and 3 due to rheumatic mediastino-pericarditis. Of the 60 patients, 12 recovered; in 2 of them a mediastinal abscess drained spontaneously by rupture into the lung. Since mediastinitis is often only part of a more widespread and extensive process the fatality-rate is always likely to be high, but if an abscess is the principal lesion its recognition and prompt drainage may well alter the prognosis.

INJURIES TO THE SEMILUNAR CARTILAGES

THE differential diagnosis of injuries to the knee-joint is not always easy: strains and tears of the internal lateral ligament and the painful knees of women who have put on weight may be mistaken for cartilage lesions. Lorenz Böhler [2] believes that only operation gives a permanently good result in a true tear of the cartilage, and that the records of "cures" by massage or irradiation mean only that the damage was not in the cartilage. A tear should be diagnosed only when there is a definite history of injury and the tenderness can be localised to a point over the joint space. Böhler notes that the pain of this lesion is sharp and disabling from the first; on the other hand injury to the internal lateral ligament may cause little immediate inconvenience, but the pain becomes gradually much more severe. The pain of the arthritic joint of the heavy woman is of still more gradual onset, although once it is established a severe attack may be completely disabling. In cartilage lesions manipulation may relieve the patient for the time being and he may walk away with little difficulty, and may even return to work until a recurrence sends him back to the bone-setter or perhaps this time to a doctor. In Böhler's experience it is rare to find blood-stained or indeed any effusion in the joint. A useful point in differentiation is that in tears of the internal cartilage *adduction* is painful because it compresses the cartilage, whereas in tears and strains of the ligament it is *abduction* that hurts. Locking of the joint is, of course, the classical sign of a displaced semilunar cartilage. It is sometimes forgotten that several other lesions produce a painful resistance to full extension which may easily be mistaken for locking by those who are unfamiliar with true locking. This is not a mistake likely to be made by a casualty officer or a football trainer, but many practitioners may have had far less opportunity of examining cartilage injuries at an acute stage. Böhler has found direct radiography of little assistance in diagnosis, except in excluding arthritis, but pneumo-radiography showed up the torn or displaced cartilages in 80 per cent. of Böhler's cases. As to treatment he is convinced from examination of the records of his own series of 300 cases that the proper procedure is removal of the torn fragments of cartilage rather than complete extirpation. Any recurrence of symptoms is due, in his opinion, not to fresh tears but to failure to remove the torn part of the posterior horn. His technique is designed to expose that horn fully and to find and remove the tag. It is instructive to learn that since he has given up suturing the synovial layer he has had no trouble with post-operative effusion. Like many other experienced surgeons he has ceased to fear joint infection. Even septic skin wound and a synovial sinus do not necessarily lead to suppuration in the joint.

[1] Keefer, C. S., *Arch. int. Med.* July, 1938, p. 109.
[2] *Wien. klin. Wschr.* Sept., 1938, p. 972.

VENOUS TONUS AND CARDIAC OUTPUT

VEINS have been rather neglected by investigators of the vascular system. McMichael [1] observes that anatomists have taken little interest in such variable structures; physiologists have regarded veins as mere passive tubes subsidiary in importance to the more dynamic forces of the heart and arteries, while venous pathology has usually been disposed of in a few uninteresting lines in standard text-books. That clinicians and physiologists have for so long been content with the concept of a vein as a passive channel is astonishing, for it may show embarrassing activity in its response by contraction to attempts to insert a cannula or a needle into its lumen. In 1936 Capps [2] put forward a method of measuring the tone of the capillaries, venules, and veins of the hand, and tentatively suggested that changes in venous tone were important features of acrocyanosis, postural hypotension, and congestive heart failure. Using this method Wilkins and others [3] showed that the venous system played an active part in the circulatory collapse induced by sodium nitrite, and were led to hope that a study of the venous side of the circulation would help to solve the problems of peripheral circulatory failure. That a rise of venous

[1] McMichael, J., *Edinb. med. J.* August, 1938, p. 161.
[2] Capps, R. B., *J. clin. Invest.* 1936, **15**, 229.
[3] Wilkins, R. W., Haynes, F. W., and Weiss, S., *Ibid*, 1937, **16**, 85.

pressure, so far from being a sign of failure of the circulation, might actually be a compensating mechanism to maintain the output of the heart at a higher level was suggested by Fishberg.[4] McMichael now presents evidence that reflex adjustments of the venous capacity take place in congestive failure. He measured the venous pressure in the jugular vein, as recommended by Sir Thomas Lewis, and the cardiac output by Grollman's acetylene method. In the first stages of cardiac failure, when the cardiac output falls, no significant change was noted in venous pressure, which is evidently not increased by mere lack of forward pressure. At a later stage the venous pressure rises and the cardiac output tends for a time to rise also. As the failure of the heart progresses the venous pressure increases, but the failing heart is unable to respond to the stimulus and the cardiac output falls. The mechanism of the rise of venous pressure is not clear; probably sympathetic activity and an increase of the circulating blood volume each play a part.

The idea that the rise in venous pressure may be compensatory brings up the question of the value of venesection. To reduce the venous pressure by venesection in the early stages of cardiac failure would be to hamper one of the compensatory mechanisms of the circulation; but in the later stages, where there is systemic and pulmonary congestion, venesection should relieve the pulmonary congestion without diminishing the cardiac output. This interpretation of the mechanism would account for the clinical impression that venesection relieves pulmonary congestion more than it does systemic, and that its main value is to facilitate the oxygenation of the blood passing through the lungs. The possibility that the veins and perhaps the blood stores of the body may act as active regulators of the venous return to the heart and so affect the cardiac output is thus of more than theoretical interest. Further investigations of their function may well influence the treatment of circulatory disorders.

"MR. THERM" AND HIS PARENT

THE name of Charles Carpenter will probably be best remembered through his part in the introduction of a method of selling gas based on a unit of energy rather than on one of volume. The introduction of the therm was, with the other changes accompanying its legalisation, a landmark in the history of an industry which, according to the Census of Production, in 1935 produced £63,606,000 worth of commodities and employed 118,671 persons—incidentally consuming over 10 per cent. of the coal distributed in Great Britain. When Carpenter entered it in 1884 the gas industry was not in a happy state. Gas was sold by volume—the most convenient way of measuring it—and its quality was tested by measuring the light emitted when it was burned in one or other of the standard burners prescribed (and very loosely described) by the Act of Parliament applying to the particular undertaking. These burners were mostly not of a kind which it was likely that many consumers would use. The results obtained with them bore no easily ascertainable ratio to the light obtained by consumers in burners which they did use; and the introduction of the Welsbach mantle made these tests meaningless. Carpenter saw that the real criterion of the value of any fuel was the heat developed by burning a unit of it and in 1920, when his company approached Parliament for new powers, he suggested a new unit of sale: the Therm (= 100,000 British thermal units)—the number of therms used by the consumer to be obtained by multiplying the meter reading in cubic feet by the declared (and tested) calorific value and dividing by 100,000. By this means the consumer pays on the basis of two easily and accurately obtained definite physical quantities and can compare the value of gas in different districts with reasonable certainty. The therm also enabled comparison to be made between gas and other sources of heat of declared value.

Carpenter occupied a foremost place in the group of men who raised the gas industry from a highly developed but purely empirical industry to a scientific means of utilising and distributing the energy latent in coal. But for such men gas might have become obsolete instead of occupying, as it does, a foremost place in the chemical industries of this country and of the world.

A POWDER FOR RINGWORM

A STUDY of the prophylaxis and treatment of mycotic infections of the glabrous skin by Lieut. D. T. Prehn of the United States Navy Medical Corps is based on observations of 576 cases occurring in ships.[1] The established "wet" treatment with 10 per cent. sodium thiosulphate soaks and dressings was found after five months of trial to be ineffective, besides being unpopular with the men. Many proprietary remedies had previously been tried in vain. The problem Prehn set himself was to find or concoct a remedy tolerated by the skin to which all the clinical manifestations of infection by the fungus would respond. Since the site of infection included the interdigital spaces of the toes (most common), the crutch, the axillæ, the hands, and even the external auditory meatus the task was no simple one. Prehn rightly disapproves of the use of ointments on physiological grounds and favours a powder. The most suitable powder for routine use in prevention and treatment was in his experience the following formula: salicylic acid 5 g., menthol 2 g., camphor 8 g., boric acid 50 g., starch 35 g. The claim to have cleared up infection completely in 5 ships in about two months is impressive enough to warrant trial of this powder, though it is against all therapeutic experience that any one remedy should be specific against all types and phases of cutaneous ringworm. Most experienced dermatologists might well hesitate to rub this powder into acute patches of eczematoid ringworm. Prehn himself adds the proviso that it "may be diluted" by the addition of more starch. The fact, however, that all the men seemed ready and even eager to use the powder three times a day suggests that it caused no discomfort or irritation.

POST-OPERATIVE DEHYDRATION

ADEQUATE urinary output is often regarded as sufficient evidence of a return to normal of the fluid-content of the body tissues after surgical operations. The importance of the "insensible" loss of water vapour from lungs and skin must not be overlooked. Fuge and Hogg[2] point out that severe dehydration with blood concentration may occur even when the excretion of urine is satisfactory. They attempted to measure the loss through evaporation by making daily records of the weight of a group of patients, noting also the weights of intake, output, bedclothes, and so forth, and attributing any loss of weight that could not be accounted for to the

[4] Fishberg, A. M., Heart Failure, London, 1937.

[1] *J. Amer. med. Ass.* August 20th, 1938, p. 685.
[2] Fuge, W. W., and Hogg, B. M., *Ann. Surg.* 1938, **108**, 1.

insensible loss. This varied with the body-weight from 1154 to 1830 g. per day in twelve patients. The average loss for 175 twenty-four hour periods was 1457 g. per period. The insensible loss averaged as much as 39·4 per cent. of the total output. Daily weighing of surgical patients is hardly practicable, but these observations suggest the wisdom of ensuring an excess of fluid intake over output of at least 50 oz. in twenty-four hours.

TECHNIQUE OF RETINAL REPLACEMENT

UNTIL the year 1929 retinal detachment was regarded, with very few exceptions, as irremediable. In that year Jules Gonin after years of painstaking clinical and pathological research announced his ability to cure the detachment by surgical closure of the tear and evacuation of the inter-retinal fluid. Many technical modifications of Gonin's method have since been elaborated by ophthalmic surgeons. Gonin's success depended upon striking the retinal tear or hole with a single cautery puncture through the sclera, choroid, and retina; precise pre-operative localisation of the hole was essential and in cases where the tears were large or multiple this procedure was inadequate. It is by no means easy to determine the exact site of a retinal hole, which depends on judging correctly the degree of displacement of the detached retina bearing the hole, the refraction of of the eye, and any irregularities in its shape. To meet these difficulties it was proposed to induce an area of aseptic choroiditis around the site of the retinal hole so that after evacuation of the inter-retinal fluid the detached retina could form adhesions with the choroid; by sealing down the edges of the tear any seepage of fluid from the vitreous into the inter-retinal space would be prevented. Precise localisation of the retinal hole was then not so essential since the area of choroiditis induced allowed for a margin of error. The aseptic choroiditis has been produced in a number of ways, chemical or thermal. Caustic potash has been applied directly to the choroid after removal of a number of scleral discs by a trephine 1·5 mm. in diameter, and then neutralised by acetic acid; a small quantity of caustic potash has been injected into the suprachoroidal lymph space through a trephine hole. With the electro-cautery multiple fine punctures have been made into the inter-retinal space down to the choroid for the evacuation of the inter-retinal fluid at the end of operation. More recently surgical diathermy has been applied to the surface of the sclera by a blunt electrode or by perforating it with fine needles 0·5–1 mm. long. Accurate localisation of the retinal tear has been facilitated by drawings and plans of the fundus and of the exterior of the eye to be used by the surgeon as a guide at the time of operation. J. Cole Marshall [1] and H. J. M. Weve [2] have devised charts upon which may be plotted the site of the tear and other lesions of value for localisation and identification at operation. During treatment it is essential to verify by ophthalmoscopic examination the reaction produced in the choroid after every application of the diathermy electrode. The surgeon has to satisfy himself that sufficient reaction has been produced to hold the retina and choroid together during convalescence. To ensure complete evacuation of the inter-retinal fluid a number of manœuvres have been employed including thermo- and galvano-cautery puncture, scleral trephining with puncture of the choroid, the insertion of diathermy needles, nails, and pins, aspiration of the inter-retinal fluid, and injection of air into the vitreous at a point opposite the detachment—the last in combination with one of the other procedures. C. J. Blumenthal has lately published [3] a device for sucking the inter-retinal fluid through puncture holes made in the sclera by diathermy or by the insertion of a needle. The fluid is aspirated by oral suction until ophthalmoscopic examination shows the retina lying snugly against the choroid. Probably the best technique has yet to be elaborated. The surgical principles to be followed are now well known; they must be followed with the utmost care and conscientiousness.

[1] *Lancet*, 1938, **1**, 1033.
[2] *Bull. Soc. franç. Ophtal.* 1936, **49**, 281.

THE FATTY LIVER

FATTY livers are common enough in the post-mortem room and yet we are still far from understanding their pathology. The pioneer work of Virchow and later of Rosenfeld attributed the accumulations of fat in this organ to the action on the liver cell of a toxic agent which prevents it from disposing of the fat continuously brought to it. The method of production of a fatty liver is now known to be far less simple. The fact that the injection of certain extracts of the anterior lobe of the pituitary into rats, rabbits, or guinea-pigs produces a large accumulation of fat within the liver suggests that the amount of fat within the liver may be directly or indirectly under hormonal control. In 1924 F. N. Allen and his colleagues showed that administration of whole pancreas by mouth to depancreatectomised dogs, maintained on an adequate diet and sufficient insulin, prevented the fatty infiltration of the liver and premature death which ordinarily occurred. Six years later J. M. Hershey showed that lecithin could successfully replace raw pancreas in the diet of such animals. Best, Hershey, and Huntsman found that lecithin could prevent the deposition of fat in the livers of rats fed on a high fat diet, and further that choline was the only part of the lecithin molecule active in this respect. Two years ago Dragstedt and his colleagues [4] announced the discovery in raw pancreas of a substance other than choline which prevents fatty infiltration of the liver. Various attempts to confirm their findings have not been successful, but now Prof. Channon and his colleagues [5] have carried out carefully controlled experiments which leave little doubt that the claims of Dragstedt are justified and that this work opens a new line of study. Meanwhile it is difficult to reconcile the new knowledge with the old teaching. Are we to abandon completely Virchow's conception of a direct toxic action on the liver cell even by such poisons as chloroform, phosphorus, and bacterial toxins? Do such agents depress the functions of the liver cell? Do they stimulate the anterior pituitary to produce an increased amount of hormone, or do they antagonise or destroy choline or the unknown pancreatic factor?

SUMMER Time, which began in Great Britain, Ireland, the Channel Islands, and the Isle of Man on Sunday, April 10th, will end on Sunday next, Oct. 2nd, at 3 A.M., when the hands of timepieces should be put back to 2 A.M. The hour 2–3 A.M. summer time will thus be followed by the hour 2–3 A.M. Greenwich time.

[3] *Brit. J. Ophthal.* September, 1938, p. 542.
[4] Dragstedt, L. R., Van Prohaska, J. V., and Harms, H. P., *Amer. J. Physiol.* 1936, **116**, 36.
[5] Channon, H. J., Loach, J. V., and Tristram, G. R., *Biochem. J.* 1938, **32**, 1332.

SPECIAL ARTICLES

THE SURGEON AND HIS INSTRUMENTS

By W. H. OGILVIE, D.M., M.Ch. Oxon., F.R.C.S.
SURGEON TO GUY'S HOSPITAL

WHEN I was a student I heard a famous surgeon say, as he took up the knife to remove an appendix, "the bogey for this operation is six minutes." To-day we look on such a remark, or rather the state of mind it betrays, as being just 120 years behind the times. Speed was an essential in pre-anæsthetic surgery. It was the ideal of the brilliant, blustering, brutal crowd among whom gentle scientists like John Hunter and Astley Cooper were such remarkable exceptions. It even had some appeal in the early days of chloroform and ether, when new and ambitious operations were being undertaken for the first time, and only the man who could work rapidly could steer a patient safely between the Scylla of shock and the Charybdis of narcotic intoxication. But to-day when innumerable anæsthetic methods suitable to every occasion are available, the only possible ideal of surgery is that the operation should be done as well as possible. If, by adding ten minutes to its time, it can be improved in the least detail, those ten minutes must be taken. If by suturing an additional layer; if by substituting interrupted stitches for continuous, more perfect healing is more surely attained, those extra steps must certainly be adopted. Bogey should be tissues divided gently and cleanly, as far as possible along anatomical planes; hæmorrhage forestalled rather than arrested by seizure of every possible vessel as it is encountered, and ligature of bleeding points with a minimum of perivascular tissues; closure without tension or strangulation of living tissues in the grasp of sutures, yet with anatomical reconstruction of divided planes and obliteration of all dead space. After an operation so performed the patient should return to bed neither shocked nor exsanguinated, reacting to the ordeal no more than to that of a hard game of tennis. In ten days' time the wound should be a pink hair line with no induration to mark it from surrounding tissues. In three months it should be invisible.

This ideal can be attained only by constant effort. The craftsman—and I would call the surgeon a craftsman rather than an artist, for the first title retains unsullied its tradition of sound work—is his own taskmaster and critic. He sets himself certain standards, and, in his attempt to reach them, is continually studying his materials and modifying his methods. To do his best work he must have his tools exactly as he likes them. Hence, though the problems of operative technique are the same everywhere, each man solves them in a way that is essentially his own. Surgery is long and life is short, and the enthusiast can only hope to make some advance during the brief years in which he may and can work, if he thinks out the difficulties he will have to face, and how he hopes to surmount them.

Surgeons seem to fall into two natural categories, the good and the bad; the good who care, the bad who are indifferent, lazy, self-satisfied, or temperamentally unsuited to their calling. The good may be subdivided further into the merely good, who bring to their task no more than enthusiasm and natural ability, the better, good surgeons who work with good assistants, and the best, who have not only good assistants but tools exactly suited to the work in hand. Thus the first matter for the new-made surgeon to settle is that of his workshop and his mates.

The problem of team work does not arise in countries where surgery is in the hands of a chief leading a big unit, with a group of senior and experienced assistants serving him for long periods, and a permanent theatre staff. It is always with us in Britain where every man's work is divided between several hospitals and nursing-homes in each of which he has a small number of beds, where assistants are usually inexperienced and temporary, and nurses remain in the theatre for periods of training only. Yet this arrangement is not one to be changed lightly, for it gives to British surgery its wide outlook and peculiar virility. Here, by a kind of natural selection, the good man cannot be kept down nor the bad one bolstered up indefinitely. The frustrated genius and the enthroned gas-bag are common enough in the large clinics, but rare under our haphazard yet on the whole successful system. This system does however present very special difficulties to the surgeon at the start of his career who is anxious to ensure that his operating shall be as neat and safe as he can make it. If he means to do good work, and keep on doing it day after day, he must arrange, not only that he has the tools he wants, but that they are available when he wants them and in the order in which they are required. He must be able to develop and expand his technique unhampered by any doubts or uncertainties, sure of getting the same service whenever and wherever he works.

SETTING OF THE THEATRE

In attempting to solve this matter of tidy operating for myself, I was led to model my theatre as far as possible on the lines of the carpenter's bench, where all the tools are kept in their own notches or compartments, those most used nearest to hand, and where

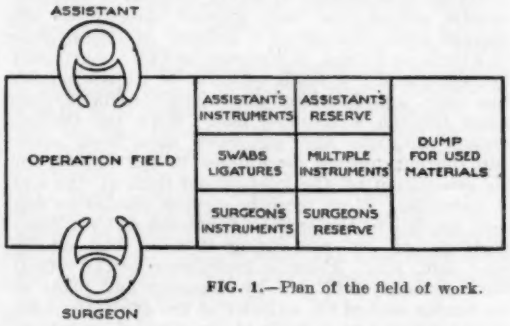


FIG. 1.—Plan of the field of work.

order is assured provided that each is returned after use to its proper place. This system of operating has already been described in THE LANCET (Dec. 8th, 1934, p. 1268) but its outlines may be restated here since it has been shown by eight years' experience to be eminently practical, and since it has been adopted by the majority of those who have worked with me as juniors. The underlying principle is that the table with the patient on it is divided into three zones—the operation field, the reserve of instruments, and the dump (Fig. 1). The first should contain only those instruments in use at the time, the second corresponds to the carpenter's bench and carries all the tools and materials that may be wanted, the third is for soiled or discarded implements. The instrument zone is further subdivided into six areas. One side belongs

to the surgeon, the other to the assistant, and the middle is common ground, while each of these territories has a front half for things in constant use, a back half for reserve instruments.

The technical problems involved are how to provide a stable platform for the instrument zone, and how

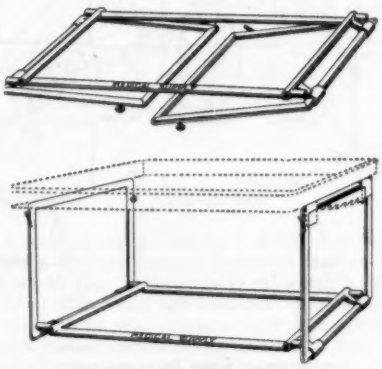


FIG. 2.—Folding tray stand.

to arrange on that platform all the different things that may be required so that everything is instantly available. They have been solved by the stand, tray, and instrument rack. The stand is a simple tubular frame that falls flat for transport and lies under the rubber mattress of the operating table with the sides hanging down when not in use (Fig. 2). It can be put at any part of the table suitable to the site of operation, and when erected forms a rigid and secure support for the tray, holding it just above the level of the patient's body. The tray is an aluminium rectangle, with sides an inch high, carrying underneath four angle pieces to fit the sides of the stand; it has also a ratchet arm to allow it to be kept horizontal when the table is tilted (Fig. 3). The instrument rack serves as a magazine for the multiple instruments, towel clips, tissue forceps, hæmostats, and so on, whose proper place is the back half of the intermediate zone. This rack consists of an horizontal bar carrying five 4-in.

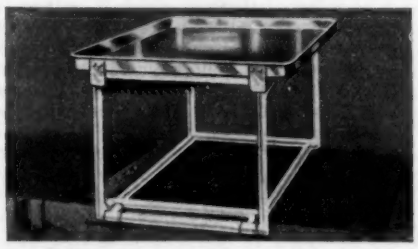


FIG. 3.—Instrument tray and stand.

pegs facing forwards and two short ones facing backwards. The bar is supported from two trestles springing from a frame 10 by 7½ in. which serves as a base (Fig. 4). The whole dismantles and folds up for sterilising, but is rigid when put together. The front pegs are for the multiple instruments, the back two are intended to take a strip of gauze in which threaded needles can be placed ready for the surgeon. The exact arrangement of materials on the tray and of instruments on the rack is a personal matter for each surgeon, and the illustration showing my own arrangement for a gall-bladder operation is merely intended to explain the text (Fig. 5).

In practice the system allows the team to have in the operation area only the tools actually in use, and one clean swab apiece. When an instrument is finished with, it is laid in its place on the tray if a "first line" instrument (knife, scissors, dissecting forceps, ligature reel) and clean, and put in the dump or given to the nurse if it is a multiple instrument or dirty (Fig. 6). The nurse's duties are merely to see that the stock of swabs and ligatures in the intermediate zone is replenished, to wash instruments given to her and return them to their appropriate place or peg, and to have threaded needles in readiness. The surgeon used to the system gets precisely the same service wherever and with whomsoever he works. He comes

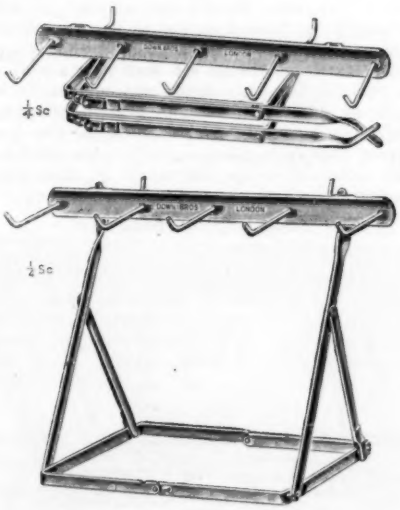


FIG. 4.—Folding instrument rack.

to know the place of everything by instinct, and, without taking his eyes off the wound, can reach out his hand and get the exact instrument he needs.

CHOICE OF TOOLS

Having settled the problem of assistance and the general arrangement of his theatre, the surgeon must next turn to his instruments. At the outset he must decide a question of principle, whether it is better to use for every job a tool specially designed for that purpose, or to maintain a simple outfit and reduce the number of one-job instruments as low as possible. In general terms he wishes to do his work as well as possible, and skill comes with practice, with repeated performance. He can increase the number of times he does one particular thing, either by doing more of everything, or by limiting the number of things he does. The latter is the more practical alternative. For all but the unusually gifted the surest way to acquire manual skill is to reduce the number of instruments to a minimum, to limit the types of skilled movement those instruments demand to two or three, and to keep the length, weight, and shape of each constant.

In operating we pick up, hold, or crush; we cut or we sew—not much else. Dissecting forceps for picking up, tissue forceps for a gentle hold and hæmostats for a firm one, Ochsners to hold or crush,

a knife to cut skin, scissors to cut fascia or sutures, and needles to sew up—these seem to be the basic equipment of the surgeon, though he must have other tools, such as towel clips and needle holders. Two movements are in constant use, the opposition of the thumb to the tips of index and medius with which we hold dissecting forceps, and the ab- and adduction of the thumb opposite the radial side of the curved and fixed medius that we use to open or close scissors or hæmostats. The more our other instruments are limited to types worked by these two movements, the more deft are we likely to become in their use. Thus a needle holder of the Lane type is preferable to the "glovemaker's friend" which closes with a whole-palm grip and opens with a further squeeze; a forceps that opens with pressure and closes automatically only confuses the pyramidal cortex. Not only should the number of different instruments be limited as far as is compatible with efficiency, but once we have decided on the type we prefer of each, we should see that they are all of the same pattern, length, weight, and curve. To be put off with an odd assortment, or accept different sorts in different hospitals, is to abandon the hope of acquiring that instinctive control of the working end of our tools that is the mark of the practised craftsman.

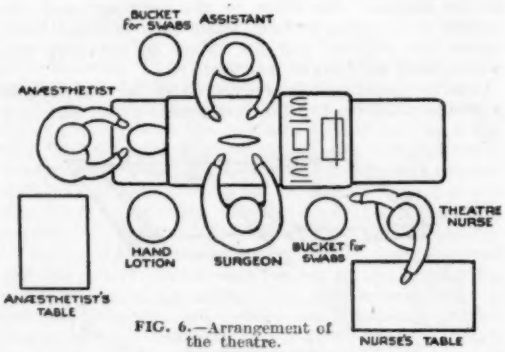


FIG. 6.—Arrangement of the theatre.

NEEDLES AND THEIR USE

Nothing in technique is more important or more difficult for the adult male to do neatly than sewing. However hard he works he will never equal his sister, who starts with a twenty-year lead. But he can do much by deciding, after careful thought, how he is going to sew and with what needles. First, does he mean to be primarily a user of needle holders or a hand sewer? With a needle holder to take a secure grip of its base he wants a small needle—a half circle one with a diameter of about ¾ in. will serve him in most situations. He uses the same movement in all his sewing, and that a single turn of the wrist, but he will find it difficult to do a continuous suture this way. Every surgeon must be prepared to work with a holder and small needles in inaccessible places, but as a primary method it appeals particularly to the man with an expert team, who can have a number of threaded needles handed to him in rapid succession. To sew with his fingers brings him nearer his work by the length of a needle holder: it allows a more delicate control of the movements of the needle, a more exact estimation of the tension of the suture. Hand sewing is particularly suited to the continuous suture which can thus be done more rapidly and neatly than is possible with a holder.

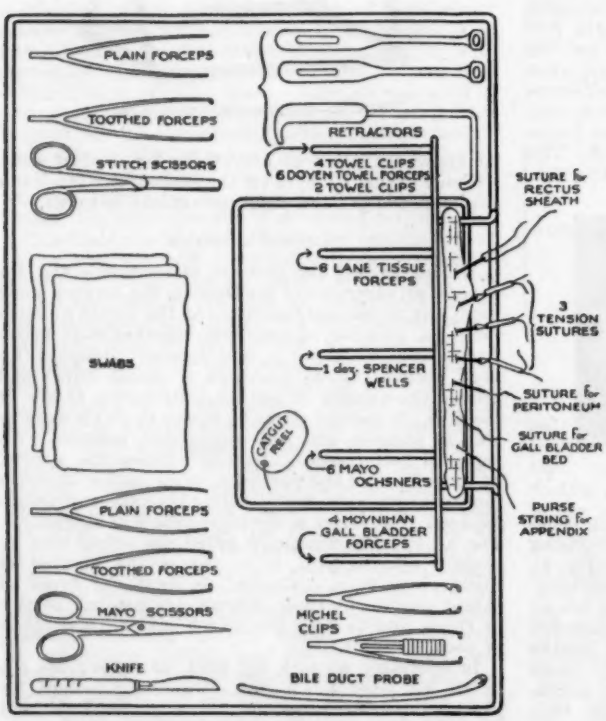


FIG. 5.—Tray and rack arranged for a gall-bladder operation.

Should he decide on finger work, the surgeon must still choose from a medley of needles that fill ten pages in any instrument catalogue. A straight needle should be the best. Women use it. A thrust on a straight needle is entirely a propelling force; however deeply it penetrates the site of its point is exactly known. But women work with their material on their lap. A straight needle can be made to take a small bite only by folding the material through which it is thrust, and it cannot be used in deep wounds. Some surgeons certainly use straight needles throughout, but their efforts pay greater tribute to their loyalty to a principle than to their wisdom. Turning to curved needles we can have them of any length, diameter, or curve. The more open the curve the more is the thrust expended in propelling the needle but the less control there is of the point. With a fully curved needle we can propel very little—most of our force is expended on the circumference of the curve: we are more certain that the point will come back to where we started, but know less where it will go in between. If we attempt to keep a wide selection of needles suited to every purpose, we are losing sight of the principle that a few manœuvres oft repeated are, in time, done more skilfully than those practised occasionally.

Arguing on these lines I decided on hand sewing, and, after some experiment, selected ⅜ of a circle as the curve best suited to my requirements, a com-

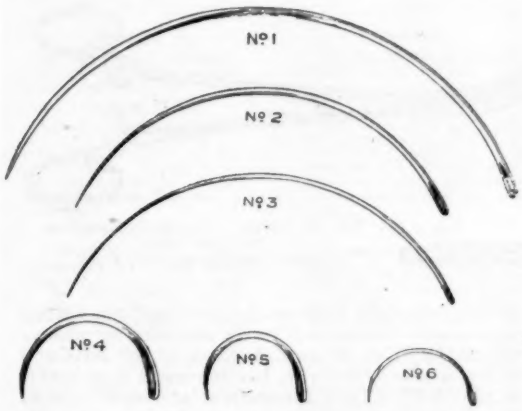


FIG. 7.—The standard needles.

promise between the straight and the full curve, straight enough for control, curved enough to be used in a deep wound. The length of a needle concerns the surgeon only, its diameter affects the tissues through which it passes and the material that passes through it. Needle makers however work on a scale of gradation, increasing their needles in diameter as they increase in length. A needle, for average work, must be at least 1¼ in. long to allow it to traverse several thicknesses of tissue and protrude sufficiently the other side to be grasped; a further 1¼ in. must be allowed in one that is to be used for hand sewing to give room for the three-finger grip that is necessary for accurate control. The whole needle must therefore be 2½ in. long.

A needle of good steel will not snap, and the smaller its diameter the smaller the hole it will make. The minimum is that size that will allow an eye sufficient to take the suture material. I required three needles, all ⅜ curve, all 2½ in. long, No. 1 triangular pointed to take stout silkworm gut, No. 2 round bodied to take No. 1 catgut for the suture of aponeuroses and soft tissues, No. 3 finer still to take 00 catgut for intestinal work, all of the smallest diameter compatible with these requirements. No such needles existed. All ⅜ curve needles that were 2½ in. long were incredibly coarse and had eyes through which my sutures dropped out. These three sizes had to be made for me, and have since been standardised (Fig. 7). They are the basic needles, and are supplemented by 4, 5, and 6, small half-circle needles to be used where a needle holder is necessary, 4 for No. 1 catgut, 5 for 00 catgut, and 6 for gossamer silkworm gut.

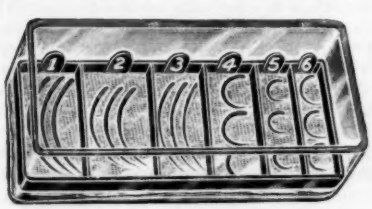


FIG. 8.—Needle grid and box.

Seeking for uniformity of service I found the greatest difficulty in getting my own needles given me even after they had been made. I put packets in every theatre in which I worked and explained their use; but that passion for geometrical patterns which passes in the female mind for tidiness led to their being arranged in order of length among the usual collection and lost in a medley of nondescripts. Even when they were kept apart the fact that all three are of the same length and curve led to confusion. This difficulty has been solved by a small plated frame with numbered compartments that can be dropped into any needle-box (Fig. 8). Each needle lies in its own compartment, and now when I ask for a No. 3 at any hospital or home I get the exact curve, length, and diameter that I have used for intestinal work for the last ten years.

RETRACTORS AND TWO SPECIAL INSTRUMENTS

A lesser difficulty, but a real one, is the selection of retractors. A task that may be almost impossible with a nearly right retractor becomes one of the greatest simplicity with the exactly right one. The right retractor is one whose width and depth correspond exactly to the tissues to be retracted. To have such an instrument at each stage of every operation demands a very wide selection, such as most hospitals possess, but which they are unwilling to turn out for every operation, and which the instrument nurse can hardly cope with. To select a useful assortment for his own private stock is a difficult matter to any surgeon. My own solution of this difficulty has been to design a set of retractors with detachable blades and handles. The blades are in five widths, 1 to 5,

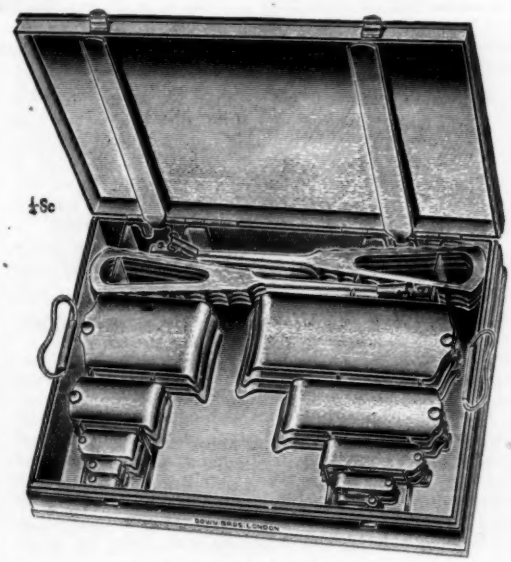


FIG. 9.—Detachable retractors in case.

and each width is made in two lengths, A and B. Thus ten different blades are available. The smallest is A.1 (½ by 3/16 in.), the largest is B.5 (5 by 2½ in.). There are two sizes of handle—one to fit blades 1 to 3, the other to fit blades 4 and 5. There are three of each size of blade and handle, so that three retractors of a size or six in all may be in use together. The whole series are securely nested in a frame 10 by 7½ in., in which they can be sterilised. This frame lies in a corner of the nurse's table, and from it she can make up in an instant the exact retractor she is asked for (Fig. 9).

Having chosen his instruments and needles, and having provided himself in the tray and rack with an assistant that will serve him for life, that knows the answers but does not answer back, the surgeon

has the means for working under constant conditions and developing such skill as his natural capacities will allow. He will still find details in his work for which nothing he possesses or can buy seems exactly suited, and he is forced to find the appropriate tool. Two such instruments of mine have been in use long enough to prove their value.

A drainage-tube should usually be led straight from the seat of trouble to the nearest point on the surface, which is rarely the wound of access. Drainage through part of a sutured incision is in any case to be deprecated. A stab wound may be made with a knife, but if this is done from without inwards the viscera must be protected with a hand which is in danger of accidental puncture, and if it is done from within the cut can rarely be made at the right place or in the right plane. The spear which was made for me in 1933, particularly for carrying a choledochostomy tube (Fig. 10), serves well for that one purpose but cannot hold a tube of another size or a corrugated drain. I have lately used a curved Ochsner forceps carrying a spear point on one blade. With this any size or type of drain can be thrust through the abdominal wall in one moment.

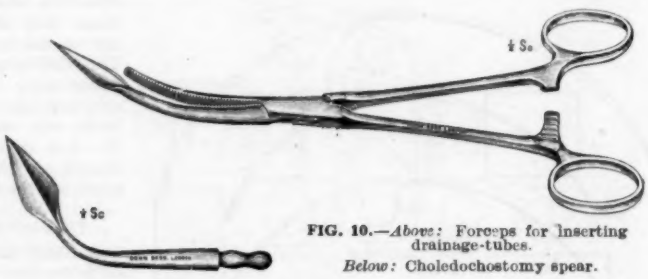


FIG. 10.—*Above:* Forceps for inserting drainage-tubes.
Below: Choledochostomy spear.

In splanchnic anæsthesia it is necessary to place the point of the needle accurately on the right crus of the diaphragm between the aorta and the inferior vena cava. This spot is easily identified by placing the middle finger of the right hand on the aorta and sliding a needle down it, but the usual long needle is too flexible, and Finsterer's armoured needle, though efficient, is apt to lacerate small vessels, and very likely indeed to tear the glove which guides it. Both are difficult to clean. The needle I have designed consists of three parts: a stilette that fits the bore accurately, the needle itself, carrying a milled head with a small projecting stud below it, and a sheath whose upper end has a double bayonet slot to engage the stud on the needle (Fig. 11). In the first position the point is inside the sheath, which can be pushed safely against stomach or vessels, slid along the finger, and pressed firmly in position; in the second position the point is protruded, and the solution can then be injected into the retroperitoneal tissues surrounding the plexus.

FIG. 11.—Needle for injecting the splanchnic plexus.

THE FOUR STAGES OF CANCER OF THE CERVIX

In 1929 the radiological sub-commission of the Cancer Commission of the League of Nations proposed rules for the allocation to clinical stages of cancer of the cervix. These rules were widely accepted and the sub-commission were able to publish in 1937 a report on the results of radiotherapy for cases treated in 1930, which has been followed this year by their second report which gives figures from many of the largest clinics for 1931.[1] The results of treatment calculated for each of the four stages over a 5-year period show once again how great is the influence of the stage at which treatment is first given to its result.

—	Patients treated.	Alive without recurrence.	Relative cure rate (per cent.).
Stage I	607	335	55·2
Stage II	1626	590	36·3
Stage III	2417	512	21·2
Stage IV	1020	54	5·3
Unclassified	2	0	0·0

Experience has, however, shown that the rules for staging issued in 1929 have been differently interpreted by different observers, and the advisory committee asked Dr. J. Heyman of Radiumhemmet, Stockholm, to prepare an atlas illustrating, by appropriate diagrams, examples of the cases which should be allocated to each of the four stages.[2] In this atlas the definitions adopted in 1929 have been "slightly modified" with a view to emphasising the anatomical basis of the stages. These are now based solely on findings which can be established by the various methods of clinical examination. It is often argued that since the allocation of a case to one or other stage allows the observer to assess the probable prognosis in groups of cases treated at different centres, the staging should be on a prognostic basis and cases judged to be hopeless because of the patient's general condition or some other factor should automatically be placed in Stage IV. This is a faulty conception of the purpose of staging, the object of which is to provide a uniform anatomical basis to facilitate comparison of results of treatment.

We set out below the revised definitions designed to this end.

[1] Second Annual Report on the Results of Radiotherapy in Cancer of the Uterine Cervix. Edited by J. Heyman. League of Nations Publications. London: George Allen and Unwin. 1938. Pp. 94. 2*s.* 6*d.*

[2] Atlas Illustrating the Division of Cancer of the Uterine Cervix into Four Stages. J. Heyman, Radiumhemmet, for League of Nations Health Organisation. London: George Allen and Unwin. 1938. 7*s.* 6*d.*

1929	*1938*
STAGE I	STAGE I
The carcinoma is strictly confined to the cervix. Uterus mobile.	The carcinoma is strictly confined to the cervix.
STAGE II	STAGE II
Lesion spreading into one or more fornices with or without infiltration of the parametrium adjacent to the uterus, with the uterus retaining some degree of mobility.	The carcinoma infiltrates the parametrium on one or both sides but has not invaded the pelvic wall. Endocervical carcinoma which has spread to the corpus.
STAGE III	STAGE III
Nodular infiltration of the parametria on one or both sides extending to the wall of the pelvis, with limited mobility of the uterus or massive infiltration of one parametrium with fixation of the uterus. More or less superficial infiltration of a larger part of the vagina with mobile uterus. Isolated pelvic metastases in the pelvic nodes with a relatively small primary growth. Isolated metastases in the lower part of the vagina.	The carcinomatous infiltration of the parametrium has invaded the pelvic wall on one or both sides. On rectal examination, no cancer-free space is found between the tumour and the pelvic wall. The carcinoma involves the lower third of the vagina. Isolated carcinomatous metastases are palpable on the pelvic wall (irrespective of the extent of the primary growth).
STAGE IV	STAGE IV
Cases with massive infiltration of both parametria extending to the wall of the pelvis. Carcinoma involving bladder or rectum. The whole vaginal wall infiltrated or one vaginal wall infiltrated along its whole length with fixation of the primary growth. Remote metastases.	The carcinoma involves the bladder as determined by cystoscopic examination or by the presence of a vesico-vaginal fistula. The carcinoma involves the rectum. The carcinoma has spread outside the true pelvis (below the vaginal inlet, above the pelvic brim, distant metastases).

The stages are illustrated by an excellent series of drawings by Dr. Strandquist, and the intention of the authors is made quite clear. The most important difference is the reduction of the number of cases allocated to Stage IV, and the opinion is expressed that although this will make it less easy to compare results obtained before and after 1938 at the same clinic, it is of minor importance, because it will not affect the comparisons of the results obtained in the same year at different clinics. Only international experts are in a position to judge of the necessity of more strict definitions and of their rigid interpretation, but it is impossible to agree that the modifications now made are of little moment. Those cases hitherto placed in Stage III because of nodular infiltration extending to the wall of the pelvis, which form a considerable proportion of those admitted to any clinic, are now to be classified as Stage II, and with them move the cases involving the upper two-thirds of the vagina, leaving little of the group originally placed in Stage III but the rare cases where pelvic nodes can actually be palpated. On the other hand, Stage III takes from the old Stage IV the cases with massive infiltration of both parametria and all cases previously placed in this stage on account of vaginal involvement, leaving only proved involvement of bladder or rectum and distant metastases in the new Stage IV.

The undoubted improvement in clarity and definition of the classification is unfortunately purchased at the cost of a serious loss of continuity. The difficulty its adoption will bring to comparisons of results obtained in any clinic before and after 1938 is perhaps negligible from the international point of view, but the clinician may learn quite as much from assessing the progress that he has made through experience and changes in technique as from comparison of his results with those obtained at other centres. Instructions facilitating international research will doubtless be accepted and even welcomed but it may be hoped that the classification now set out will not be lightly altered. Some clinics may decide to retain for local statistics the former basis of classification, if consecutive results are being tabulated with a special object in view. It is important however that if this is done the details of each lesion should be supplied, so that for international purposes the cases can be reclassified.

INTERNATIONAL SOCIETY OF SURGERY

(FROM A CORRESPONDENT)

THE eleventh triennial congress of this society took place in Brussels from Sept. 19th to 22nd and was in every respect an outstanding success. The change of venue from Vienna to Brussels allowed a few weeks for preparation, and the smooth running of the arrangements says much for the energy and resource of the Belgian members, inspired by the indefatigable secretary-general, Dr. Leopold Mayer.

Some 400 members were present, nearly all nationalities being represented; there were visitors from New Zealand, South America, China, Iran, Syria, Finland, and Iceland. The official inauguration took place in the beautiful senate chamber in the presence of a representative of the King. The Minister of the Interior and Public Health, who presided, delivered an oration in the name of the Belgian Government, and he was followed by Burgomaster Max and the president of the university. Prof. Jean Verhoogen, president of the International Committee, spoke on behalf of the Society, and was followed by the venerable Prof. Giordano of Venice, who made some remarks "au nom de tous les étrangers." Dr. Mayer's report had to be presented by Dr. P. Lorthioir, the treasurer, as the secretary-general was in hospital with a broken thigh. The president of the congress, Dr. Rudolf Matas of New Orleans, then delivered an address in French on Surgeons and the International Spirit.

The scientific sessions were held in the auditorium named after Bordet, the famous bacteriologist, where the acoustics were good, the arrangements for projection adequate, and the seats comfortable, but there was apparently no means of ventilation. Those whose linguistic abilities being imperfect had looked forward to a trial of the Geneva system, whereby the listener wears headphones and can select one of three languages in which to hear the speakers, were disappointed. Speakers who used good slides with clear captions in two languages were appreciated by the audience.

HYPERTENSION

At the first scientific session N. Pende (Rome) opened a discussion on the surgical treatment of hypertension. He stressed the importance of selection and especially the necessity of excluding the elderly with senile changes. It is his belief that splanchnic section is sufficient, division of the greater and lesser splanchnics on the left side is often indeed adequate. He employs the lumbar extraperitoneal approach and has had no mortality and very encouraging success. P. Wertheimer (Lyon) presented the physiological point of view, and suggested that different causative factors might be involved in different cases. R. Alessandri (Rome) spoke of the difficulties of diagnosis and the importance of selection of cases. M. Peet (Ann Arbor), from his experience of 375 cases, spoke encouragingly of sustained symptomatic

improvement evaluated not by the operator but by independent physicians who examined the patients afterwards. Most cases, he thinks, are neurogenic and hereditary. As a general rule operation was not undertaken in those under 50 nor with a blood pressure below 200. He divides the splanchnics using a posterior vertical incision, both sides being operated upon at the same sitting. In 50 per cent. of the cases the operation gave better and more lasting results than any other form of treatment. E. Cutler (Boston) gave his experience of some cases associated with thyroid disease.

Among the shorter communications on the following morning was one by R. Klapp and J. Baumann (Marburg) on the treatment of fractures by traction and distraction.

THE BONE GRAFT

The second major discussion was introduced by B. Cuneo (Paris) and Fr. Albert (Liége) followed with matters of physiology and biology. D. B. Phemister (Chicago) related a series of cases in which transplantation had been employed in the treatment of tumours and dystrophies, showing by means of slides the late results. H. Platt (Manchester) dealt with grafting in recent fractures and pseudo-arthrosis. Failures were, he thought, the result of technical faults most of which could be avoided—e.g., (*a*) infection, (*b*) inadequate contact between graft and host bone, and (*c*) insufficient mobilisation. S. Pereira (Oporto) quoted a large and complete experimental series in animals. J. Castro-Villagrana (Mexico) showed on the screen an operation for massive bone grafting for non-union of the tibia on both sides, followed by an excellent result. A. Chiasserini (Rome) spoke on beef bone grafts which when small were often successful.

CYSTS AND TUMOURS OF THE LUNG

The third set discussion on the surgical treatment of cysts and tumours of the lung, was opened by F. Sauerbruch (Berlin), but owing to an unfortunate slip in the time-table many who were eager to hear him missed the greater part of his remarks. H. Costantini (Algiers) spoke on the physiological problems; J. Arce (Buenos Aires) on the treatment of hydatid cysts. Tudor Edwards (London) dealt with malignant new growths of the bronchi. With modern methods a diagnosis could be made in 60 per cent. of cases. He had had good results from the implantation of radon seeds. A. L. d'Abreu (Cardiff) gave his experience of cysts in a series of slides with the captions in both French and German.

A special feature of the congress was an exhibition dealing with the problem of hydatid disease as met with in the Argentine. This was from the Institute of Clinical Surgery of the University of Buenos Aires and the Faculty of Medicine of Montevideo, arranged by Prof. José Arce and Dr. Perez-Fontana. The exhibit consisted of pathological specimens, drawings, charts, maps, and a large number of X ray films, well arranged and organised.

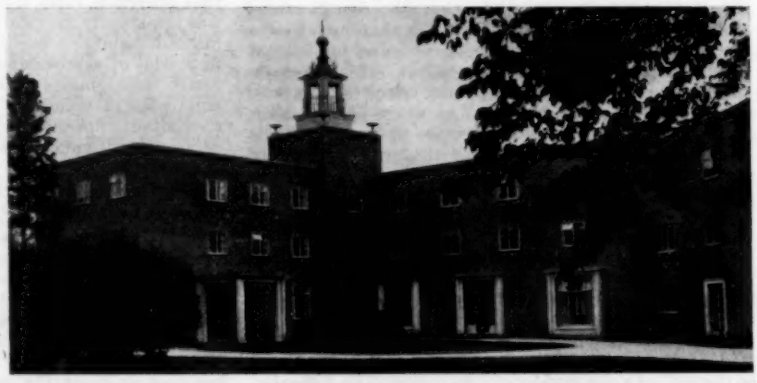
Several operative sessions were held at Brussels and at Louvain, while some visitors took the opportunity of visiting clinics at Bruges and Antwerp. In Brussels the new Hospital of Saint-Pierre was open for inspection.

The next congress will be held in Stockholm in the summer or early autumn of 1941. Dr. Leopold Mayer of Brussels who has served the society for 30 years as secretary-general was elected president for the next three years. Dr. L. Dejardin (Brussels) becomes secretary-general. Prof. Lenormant (Paris), Prof. Alessandri (Rome), Prof. Arce (Buenos Aires), and Prof. Grey Turner (London) were elected vice-presidents, Sir D'Arcy Power was unanimously and with acclamation elected *president d'honneur*. The subjects chosen for discussion were: (1) The complications of operations—(*a*) shock with its prevention, (*b*) conditions due to chemical changes, (*c*) vasomotor changes, (*d*) pulmonary changes, and (*e*) vascular changes. (2) Treatment of pulmonary tuberculosis by surgical means and its late results. (3) The late results and complications of operations on the biliary apparatus.

Hospitality, both private and official, was lavishly bestowed on all who attended. The perfect weather added much to the enjoyment of all concerned.

THE HEARTS OF OAK CONVALESCENT HOME

THE Hearts of Oak Benefit Society, which was one of the pioneers of convalescent home benefit fifty years ago, has now realised a long-standing ambition by building a convalescent home of its own. The new home, which admitted its first patients three weeks ago, is near Broadstairs, on the high ground behind the North Foreland golf course, and within a quarter of an hour's walk of the sea. The ten-acre grounds of Callis Court, the old house which was demolished to make room for the home, are ideally suited to their new purpose, with level lawns sheltered by twelve-foot yew hedges, and ample provision for fruit and vegetables. The society's aim has been to make its members feel they are in a country hotel



rather than an institution; regulations have therefore been reduced to a minimum and patients will have none of those irksome domestic duties which are inevitable where the staff is limited by scarcity of funds. It has been possible, too, to provide a certain amount of privacy by giving each patient a separate bedroom.

The home is for men only and will accommodate fifty patients. Its design is purely utilitarian, and its sole ornament is a low tower surmounted by a glittering golden ball which rivals the lighthouse half a mile away. It is made of light brick, with three storeys and a flat roof. Most of the bedrooms are on the first and second floors, but for fracture cases and others who find stairs difficult there are four bedrooms with bathrooms and lavatories in a small wing on the ground floor. Heart cases, who may need attention during the night, will have rooms on the first floor near the staff bedrooms, and will be taken up and down in the lift. Apart from a suite for visitors the rest of the ground floor is taken up with day-rooms, offices, and kitchens. The matron and assistant matron have their offices near the main entrance, and beyond these are the doctor's consulting-room with its waiting-room, and the patients' locker-room. Opening out of the main hall are two billiard-rooms, a second hall with a ping-pong table, and through this the patients' dining-room, in which little tables for half a dozen men replace the usual long dining tables. A short passage from the hall leads past the staff dining-room to the lounge, where ailments can be compared enjoyably in easy chairs, and then to the library whose thrillers were chosen by a master hand. The day-rooms all look out through big windows on to the grounds, and upstairs many rooms have views of the sea over the downs as well. The doors are painted in different art shades on each floor and the terrazzo floors and staircases are a singularly pleasing light oak colour. The bedrooms are comparatively large, with well-sprung bedsteads, arm-chairs, and basins with hot and cold water. A rather bigger room on the first floor, with its own bathroom and lavatory, is reserved as a sick-bay.

With such a home de luxe the society should find itself swamped with applications for convalescent benefit (it may introduce a new type of malingerer who pretends to be convalescent from an imaginary illness), but at present at any rate the accommodation is expected to be more than sufficient to meet the demands of the society's million or so members.

MEDICINE AND THE LAW

Inquest Verdict versus Magisterial Decision

SOMETHING of a clash between the coroner's court and the magistrate's court has arisen this month at Ormskirk, owing, as it seems, to the unexpected action of the coroner's jury. As is well known, the amending Act of 1926 was passed to prevent the overlapping of simultaneous investigations before the coroner and the examining magistrates. Section 20 of the Act directs that, if the coroner is informed that someone has been charged before examining justices with the murder, manslaughter, or infanticide of the deceased, the coroner shall, in the absence of reason to the contrary, adjourn the inquest until after the conclusion of the criminal proceedings. Mr. R. W. Brighouse, deputy coroner for South West Lancashire, had to investigate a death due to a traffic accident. When he had opened his inquest, the police intimated (under Section 20) that they proposed to institute proceedings for manslaughter against a motor cyclist who had been involved. Mr. Brighouse therefore adjourned the inquest. The motor cyclist was charged before the Ormskirk magistrates at the end of August. They dismissed the charge, and consequently the adjourned inquest was resumed on Sept. 7th. The deputy coroner explained the position to the jury; he told them that in his view there was no evidence of a criminal offence and he called only formal evidence. The ways of juries are inscrutable. This jury brought in a verdict of culpable negligence, the foreman remarking during a brief dialogue with the coroner: "We're not going to let him get away with it." There were, it appears, facts in his past ventures on the road which told against the motor cyclist, but this verdict had been given on the formal evidence only. The deputy coroner expressed his dissatisfaction with the verdict and adjourned the court again for a week so that the full evidence might be made available. On the further resumption the jury brought in a verdict of criminal negligence. Although, therefore, the inquest has been discarded in favour of the parallel procedure in the police-court, although Section 20 was described in the first chapter of the 1936 report of Lord Wright's committee as "a statutory recognition of the fact that under modern conditions the functions of the coroner are mainly directed to other than criminal investigations," the Ormskirk proceedings show that the coroner's inquisition can still be useful as a second barrel if the first barrel—i.e., the police-court charge—has missed the mark. A proviso to Section 20 stipulates that if, in the course of the criminal proceedings, anyone has been charged on indictment, then the resumed inquest must not result in a determination inconsistent with the decision in the criminal proceedings. Thus, if the motor cyclist had been committed by the magistrates to the assize court and had there been acquitted after indictment, the coroner's jury at a resumed inquest could not have found him guilty. In the Ormskirk case there was not an acquittal at assizes but a refusal by the magistrates to commit for trial at the assizes. Section 20 leaves it possible for a coroner's jury to act as Mr. Brighouse's jury did. One member of Lord Wright's committee, not in agreement with the majority of his colleagues on this point, saw no great harm in this position. Sir Archibald Bodkin, in the course of certain reservations which he made in a minority report, pointed out that sometimes the police cannot obtain sufficient evidence to justify the arrest of a person on a charge of murder, manslaughter, or infanticide—for instance, if essential witnesses refuse to tell the police what they know. Where this happens, said Sir Archibald, the coroner's inquest is the only method of compelling disclosure; "I regard the coroner's power in such cases as valuable adjuncts to the present administration of the criminal law."

THE SERVICES

ROYAL NAVAL MEDICAL SERVICE

THE following have been appointed as surgeon lieutenants, R.N., for short service: P. A. Allsopp (Middlesex); K. Biden-Steele (Guy's); A. Coull (Aberd.); R. W. Duncan (Trinity College, Dublin); L. H. Duthie (Aberd.); J. D. C. Gowans (Birm.); P. Jones (Liverp.); P. J. O'Meara (Birm.); P. J. O'Reilly (University College, Dublin); A. S. R. Peffers (St. And.); J. Robertson (Edin.); J. Robyns-Jones (Liverp.); P. G. Rowsell (Durh.); H. G. Singer (St. Bart.'s); I. F. Smith (Edin.); J. Thomas (Cardiff); and H. R. Warren (Royal College of Surgeons, Dublin).

BRITISH INSTITUTE OF PHILOSOPHY.—The presidential address of this institute, entitled Twenty Years After—A Survey, will be given by Viscount Samuel at University College, Gower-street, W.C., at 8.15 P.M., on Tuesday, Oct. 11th. Cards of admission can be had from the director of studies at University Hall, 14, Gordon-square, London, W.C.1.

CONTROL OF THE COMMON FEVERS

BACILLARY DYSENTERY

Reviewed by Dr. W. M. SCOTT, *a Medical Officer of the Ministry of Health*

MANY practitioners still fail to realise that bacillary dysentery is a common disease in this country. In part this is because it comparatively seldom appears with the severity and high mortality characteristic of it in periods of war and famine and in tropical and sub-tropical regions; practitioners are no doubt reluctant to attach to what is often merely a mild gastro-enteritis a name with such unpleasant associations. Moreover the bacteriological diagnosis is somewhat more difficult than in such diseases as diphtheria and the enteric infections; unless specimens are examined in the early stages of the illness and submitted to the laboratory with proper precautions, the bacteriologist in a majority of cases may fail to detect the causal bacteria. It must therefore be emphasised that bacillary dysentery is common, that, in areas in which laboratory diagnosis is freely resorted to by practitioners, its frequency is well recognised, that severe and fatal cases in all respects comparable with the classical disease are occurring in this country especially among children, and that the incidence is increasing, perhaps because of the increased sale and consumption of ready cooked foods. The Chief Medical Officer of the Ministry of Health in his annual reports has repeatedly called attention to these facts, and has pointed out that many cases of illness, described as gastro-enteritis, gastric influenza, colitis, infectious diarrhœa, and so on, should properly be diagnosed and notified to the medical officer of health as dysentery.

GENERAL INCIDENCE

The number of notified cases and of deaths in England and Wales for the last ten years are shown in Table I; they no doubt include rare cases of the amœbic variety. There has obviously been a considerable increase in notifications during the last two years, though the number of deaths has not greatly altered. Two explanations of this apparent anomaly are possible: (1) that a less fatal type of dysentery has recently prevailed, and (2) that more cases of non-fatal enteritis are being notified as dysentery in consequence of increased resort to laboratory diagnosis. Both explanations may be correct but (2) has probably had the greater effect. In fact, during 1937 many medical officers of health circularised local practitioners informing them of the prevalence of dysentery and reminding them of their duty to notify it. In spite of this, outbreaks occurred in 1937 in which no case had been notified and the number of notified cases is certainly still far short of reflecting the actual incidence.

TABLE I—NUMBER OF NOTIFIED CASES AND OF DEATHS IN ENGLAND AND WALES

Year ..	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937
Cases ..	683	573	538	809	924	783	763	1177	1333	4167
Deaths ..	155	98	97	116	135	92	104	116	87	139

An important contributor to the incidence and mortality is the mental hospital. Cases notified from these institutions have usually constituted about 50 per cent. of the total. But the increase in notified cases in 1936 and 1937 has not been shared by the mental hospitals, the figures for them remaining at about the same level as in the past ten years, round about 400 per annum. The mortality from dysentery among mental hospital inmates has also remained fairly steady at about 10 per cent. of notified cases. The case-mortality outside is certainly very much lower; if only the frank attacks are reckoned, it may be guessed at about 2 per cent.

AGE AND SEX

Apart from these institutional cases the main incidence is undoubtedly on children, though no age is exempt. Interesting evidence of this was furnished by the careful investigation made by Charles and Warren (1929). Figures extracted from one of their tables are given in Table II; they show that 83 per cent. of cases were under fifteen. This percentage is about the same as that found among the registered deaths from "diarrhœa and enteritis" for England and Wales. In 1936, for example, there were 4990 such deaths of which 4247 (85 per cent.) were among children under fifteen. It may safely be presumed that, if bacteriological examination had been performed, an appreciable proportion of these deaths would have been added to the figure of deaths from bacillary dysentery.

TABLE II—AGE- AND SEX-INCIDENCE OF BACTERIOLOGICALLY PROVED CASES OF BACILLARY DYSENTERY

—	Under 1 year.	1–2	2–5	5–15	15–25	25–45	45–65	Total.
Male ..	2	16	26	20	3	7	3	77
Female ..	3	12	20	18	1	8	2	64
Total ..	5	28	46	38	4	15	5	141

No difference in incidence is to be noted in the different sexes except that among young children males suffer more than females.

EPIDEMIC FORM

Though large outbreaks do occur, usually as the result of massive infection of water or milk, the disease commonly appears quite sporadically or in small outbreaks confined to single families. It is exceptional for a connexion to be established between such outbreaks. The typical history in a family is the occurrence of a severe or fatal case in a child. Subsequent inquiry shows that one or more of the other children had had more or less mild diarrhœa during the previous week; from some of these it may still be possible to isolate the bacillus and specific agglutinin will usually be demonstrable in their blood. The parents not infrequently escape illness; they may be found to be excreting dysentery bacilli without showing symptoms. It is rare for the onset to be simultaneous in the members of one family and the appearance of cases in succession is also characteristic of the disease when it breaks out in hospital wards.

The children's wards of hospitals come only second to mental institutions in their liability to outbreaks of bacillary dysentery. It would hardly be an exaggeration to say that, if search were careful and continuous, no children's ward would be found to remain free from cases for twelve months on end. And once it becomes established, especially in an infants' ward, it may require the most drastic precautions before it can be stamped out.

Though all observers, both in this country and elsewhere in Europe, agree that the incidence increases from May to September, yet both the larger outbreaks and the sporadic cases are quite common in the depths of winter.

The Carrier Question

An obvious explanation of the endemic prevalence of dysentery would be the existence of "carriers" whose excreta provide the infection for new cases. But the facts are by no means so clear as in the enteric diseases. During an epidemic it is usually easy to find among the contacts persons who have not been ill but from whose fæces dysentery bacilli can be isolated. Though such persons may help to prolong the outbreak, just as mild cases do, they always become spontaneously free within a very short period. There undoubtedly occur among convalescents persistent carriers—i.e., persons who continue to excrete dysentery bacilli after their symptoms have completely disappeared. Periods of excretion of 18 months or more are on record. But many of the observations of this character have been made on persons still living in infected surroundings (mental hospitals, barracks, &c.) so that the possibility of the repeated findings representing repeated new infections cannot be excluded. It is probable that, unless actual lesions persist in the intestinal mucosa, dysentery bacilli disappear fairly rapidly from the intestine, unlike the typhoid bacillus which may survive there indefinitely, even in the absence of bile-duct infection.

Of more apparent importance is the sufferer from chronic colitis of dysenteric origin, especially if he has acute exacerbations. Bojlén (1934), however, states that among over 600 bacteriologically verified cases in Denmark in 1927–29, only 2·7 per cent. had chronic intestinal disturbance persisting after the acute attack. Of these only three continued to excrete dysentery bacilli, so that he comes to the conclusion that such patients play quite a subordinate part in the maintenance of the disease as a phenomenon of ordinary life. It is certainly rare in this country, even with careful search, to find a case of chronic colitis, or even a known previous sufferer from dysentery, as the origin of an outbreak. One may perhaps sum up the probabilities by saying that, outside institutions, chronic carriers are not an important epidemiological factor and that the persistence of the disease in a normal community is sufficiently explained by the frequent occurrence of mild undetected cases capable of transmitting infection for a period of weeks, or even, exceptionally, for some months, while leading their ordinary life. In mental hospitals, on the other hand, the repeated attacks on physically feeble persons, which are too often a feature of such institutions, are quite commonly followed by a chronic colitis, by the continued excretion of the specific bacilli, and by the consequent infection of contacts.

Diagnosis

The typical case has sudden onset with vomiting, abdominal pain, headache, and rise of temperature followed by diarrhœa which may be very frequent or almost continuous, the later motions consisting of almost pure mucus, streaked with blood and passed with much straining and tenesmus. But symptoms may be much milder, with only some colicky pains and one or two loose motions or, on the contrary, may be fulminant with rigor, intense headache, and death in a "toxic state" within a few hours. The average duration of illness is about four days. Complications are rare, but bronchitis and bronchopneumonia have been described in some epidemics.

Differentiation from food poisoning, the result of Salmonella infection or the ingestion of toxic food material, is not always easy. The presence of blood in the motions and the persistence of tenesmus would suggest dysentery, but there are exceptions in both groups. Simple microscopical examination of the mucus differentiates the bacillary dysentery from the amœbic variety (rare in this country). In the former, especially in the early stages, polymorphonuclear leucocytes in great numbers are characteristic. Bacteriological examination has, of course, the final word in diagnosis. Specimens of the stools or, if not available, rectal swabs should be sent to the laboratory with the least possible delay en route. In summer the fæcal specimen should be packed in ice; if this is not possible it should be mixed with one-tenth of its volume of pure glycerin or with an equal volume of 10 per cent. glycerin in normal saline. A positive report is possible within 18 to 24 hours of receipt of the specimen. This depends on the finding on MacConkey or litmus lactose agar plates, inoculated secundum artem with the fæces, of the characteristic non-lactose-fermenting colonies of dysentery bacilli. If a speck of such a colony is emulsified in a drop (loopful) of the specific serum, appropriately diluted, immediate agglutination signifies, with sufficient certainty for clinical and epidemiological purposes, that bacillary dysentery is present. Complete examination with further cultural and serological tests is merely confirmatory.

BACTERIOLOGICAL VARIETIES

The different bacterial species which are capable of producing dysentery are chiefly of epidemiological interest but deserve some comment. The Shiga species is rare in this country and, when it occurs, is almost invariably directly imported from tropical countries; it is always to be dreaded, producing the severest and most fatal form of the disease. The Flexner species, of which there are, at least, six serological types occurring in this country (and still more abroad, vide Boyd 1938), produces dysentery of very varying, but on the whole moderate, severity. The Newcastle species, culturally different from the Flexner (Clayton and Warren 1928 and 1929) is placed by Boyd on valid serological grounds as a Flexner type: it is not uncommon in this country (Whitehead and Scott 1934) and produces dysentery of the Flexner grade of severity. The Sonne species, culturally and serologically easily differentiated, produces on the whole a dysentery of milder degree, though severe and fatal cases do occur. It has been the chief cause of the mild dysentery which has been so prevalent in this country during the past 18 months. Clinically the disease it produces cannot be differentiated from the milder forms of Flexner infection, though it is less often associated with blood-stained motions and the mucus excreted tends to be less sticky and more slimy. The Sonne bacillus is more resistant to external destructive agents than the Flexner or Shiga and seems to persist in the fæces of convalescents for much longer periods, though this may be partly due to its greater vigour of growth on culture media and consequent greater ease of detection when present in small numbers. These characters probably account for its widespread prevalence.

Dysentery due to the Schmitz species of bacillus is rare in this country but an account of an outbreak has been recently recorded in THE LANCET (Evans 1938). Clinically a mild type of disease appears to be the rule in this infection and its interest

is mainly epidemiological. A group of cases of mild dysentery remains in which bacteriology has so far failed to establish the causal organism. In this group may be identified cases in which the *B. alkalescens* appears in such numbers as to suggest strongly that this species too should be reckoned among the dysentery bacilli, though it is more commonly responsible for infections of the genito-urinary tract.

Measures of Control

The prevalence of dysentery may be regarded with even greater justice than that of typhoid as the index of defective sanitation in a community and its recrudescence clearly indicates defects in the arrangements designed to prevent transfer of bowel infection from person to person. There is no evidence that contamination of water-supplies is responsible for the prevalence; the sporadic distribution is a sufficient answer to such a suggestion. Nor is it likely that any new factor has arisen in the habits of the country as regards defæcation and the disposal of excreta to account for it. The spread of infection can only be ascribed to defects in personal hygiene, enabling infection to be conveyed by the hands of an infected person to others, either directly or by contact with intermediate objects and especially with food and the utensils employed in conveying, preparing, and eating it. The infecting person is, with rare exceptions, a "missed case" of the disease—i.e., a person suffering so little from it as to be able to continue ordinary habits. Diminution in the opportunities of conveying dysenteric infection in the general community can only be achieved by raising the standard of personal cleanliness. One practical step in this direction would be greatly increased provision of facilities for hand-washing in association with water-closets: a tap with soap and towels, preferably of paper, should be as much a fixture of the water-closet as the roll of toilet paper; and hand-washing after defæcation should be as automatic a habit as adjusting the dress. In establishments dealing with food, proper provision of washing facilities and their use by the staff is even more imperative. In some places this is already required under local Acts and it will become a general requirement—to our great advantage—when the new Food and Drugs Act comes into operation on Oct. 1st, 1939. The sale over the counter of food already cooked is on the increase. Many such foods form a particularly suitable medium for the growth and survival of pathogenic intestinal bacteria inoculated in them by unwashed hands. The use of sterilisable instruments, tongs, forks, &c., should be insisted on in the handling of such food; protection of food exposed for sale and during delivery by means of impermeable wrappings will also do much to prevent dangerous contaminations. Cleanliness in the handling of milk, both raw and pasteurised, is of particular importance. Strong suspicion exists and, in at least one recent epidemic in this country, actual proof by the detection of dysentery bacilli in it has been obtained that milk can be the vehicle of dysentery infection. It is deplorable that defects in the handling of pasteurised milk should be allowed to abolish the main advantage of pasteurisation—the elimination of possible pathogens. Bacteriological control of the personnel of the milk industry so as to exclude "carriers" is impracticable and reliance must be placed on direct precautions against contamination by them.

IN THE CONDUCT OF A CASE

Efficient therapeutic measures are the first step in the control of dysentery; the sooner a case recovers the less chance there is of it causing spread. In the treatment of Shiga infections specific therapy with properly standardised antiserum is strongly to be recommended. Intravenous injection of 10,000 to 100,000 units should be performed (with due precautions) at the earliest possible moment and repeated if necessary. For Flexner infections specific treatment, though sera are available, has not been extensively practised and satisfactory data are wanting. In general the physician will be content to rely on such time-honoured methods as frequent small doses of castor oil (e.g., half a teaspoonful every hour till relief is obtained) or salines (30 to 60 grains of sodium sulphate hourly). In children, especially, dehydration and salt starvation may have more serious effects than any special toxic action of the bacteria and will demand appropriate treatment (continuous saline infusions, stimulants, and heat). No specific serum is yet available for Sonne dysentery and the treatment will be similar. The therapeutic effect of castor oil or salines is so definite in bacillary dysentery as almost to be a diagnostic point in differentiation from the Salmonella infections. It may be necessary to give morphia subcutaneously to relieve the acute pain in the early stages. In the later stages bismuth in large doses may be recommended.

Isolation should be attempted whenever practicable; the excreta should be treated as infectious and disposed of as in a case of enteric fever. The duration of such precautions will depend considerably on the progress of the case. A week of well-formed stools may justify liberation in ordinary households but it must be remembered that excretion of the dysentery bacillus may often continue for a month or more, though usually such prolonged excretion is associated with continuous or intermittent looseness of the bowels and the presence of mucus in the motions. Bacteriological tests before liberation should not be a routine procedure. Negative results are so unreliable that no advantage attaches to them.

IN HOSPITALS

Bitter experience has convinced the staff of many hospitals, especially those with infants' wards, that no infection is more insidious in its entrance, not even the streptococcal, and none more difficult to eradicate than bacillary dysentery. The greatest care should be taken, in the first place, in admitting children with diarrhœa into a general ward; such children should be put under observation until it is clear that the condition is not dysentery. If blood or mucus is present in the motions, a bacteriological test will usually be positive but the clinical picture alone will be enough to make it advisable to keep such a child isolated and to treat its excreta as potentially infectious. Secondly, the routine of nursing and feeding children should be such as to reduce possible transfer of infection to a minimum. No nurse should be engaged both in feeding and cleaning infant patients and all nurses should wash their hands after tending in any way to one patient before going on to another. Disinfection of crockery, &c., should be an automatic habit and the kitchen staff should be carefully instructed in the hygiene of food handling. It has often been found necessary to close infants' wards entirely on the outbreak of dysentery in them and not to reopen with the same staff for at least a month. Thirdly, careful watch should be maintained in the ward for cases of diarrhœa, and specimens of fæces from these should be bacteriologically examined forthwith, so that a case of dysentery infection may be promptly detected and isolated. Mild cases among

the nursing, domestic, and kitchen staff are a common cause of persistence of the infection in hospitals, and should be carefully sought for.

IN MENTAL HOSPITALS

It is hardly necessary to state how important bacillary dysentery is in the administration of mental hospitals and the methods are so well known to the administrators that little need be said here. Clinically "asylum dysentery" does not differ from the disease in the general population except that it tends to be more severe and has a much higher death-rate, probably because of the debilitated state of the subjects. Bojlén (1934) is satisfied that the chronic type, with intermittent excretion of dysentery bacilli, is much more likely to appear among the insane than among others, and he describes an outbreak in which out of 111 cases among mental defectives no less than 42 became chronic dysenterics. The common and perfectly justifiable practice of reserving a special ward, in which patients who have had dysentery are kept together and isolated from the rest of the institution, may, however, account for part of this tendency to chronicity: it may really be the result of frequent reinfection from the high concentration of infected subjects in such a ward. But there can be no doubt that the dysentery "carrier" is the chief cause of the persistence of the disease in mental hospitals and his control is a matter of great difficulty. Attention to the facilities for defæcation and subsequent cleansing, and care in excluding from the preparation or handling of food all persons who may be suspected of being infectious, will do a great deal to diminish the incidence, as is shown by the long periods of freedom from the disease which some mental hospitals achieve.

Vaccine Prophylaxis in Institutions

Probably by far the most efficient control measure will be found in vaccine prophylaxis which has already established itself in this country, though there is as yet no standard practice which can be quoted. A common method has been to collect the strains of dysentery bacilli of different type from cases in the hospital itself and to prepare from them a mixed vaccine which may be presumed to contain all the antigens necessary for protection against the current infections. Dosage and methods of administration have varied in different institutions, but it may be suggested that a vaccine containing in 1 ml. 150 million of each of the five common serological types of Flexner dysentery bacilli with the same number of the Sonne and Newcastle types would be a suitable preparation. The strains employed should preferably have been recently isolated and had few subcultures; this is especially necessary in the case of the Sonne type. Doses of 0·5 to 1 ml. according to age, sex, and physical strength might be advised and should be given on admission and repeated annually. Subcutaneous injection is probably preferable but some authorities have given such vaccines intravenously with good results.

REFERENCES

Bojlén, K. (1934) Dysentery in Denmark, Copenhagen (in English).
Boyd, J. S. K. (1938) *J. Hyg., Camb.* **38**, 477.
Charles, J. A., and Warren, S. H. (1929) *Lancet*, **2**, 626.
Clayton, F. H. A., and Warren, S. H. (1928) *J. Hyg., Camb.* **28**, 355.
— — (1929) *Ibid*, **29**, 191.
Evans, A. C. (1938) *Lancet*, July 23rd, p. 187.
Whitehead, H., and Scott, W. M. (1934) *Ibid*, **2**, 248.

BUDAPEST

(FROM OUR OWN CORRESPONDENT)

B C G VACCINATION

SYSTEMATIC B C G vaccination was begun in Hungary in 1934 by Prof. Joseph Tomcsik, who uses a vaccine prepared by himself. The difference between this and the older methods is that it is not only infants of tuberculous families who are inoculated but any others whose parents apply for it. Also they do not now believe in rigorous segregation of the inoculated babies but endeavour to lessen the danger of infection by thorough teaching of the parents and the people generally. The University hygienic institute in Szeged distributed up to June, 1937, sufficient vaccine for 2045 infants, and since then vaccine is prepared and the inoculation arranged by the Royal Hungarian National Public Health Institute. At present B C G injections are being used at 152 places and the number of infants vaccinated since July, 1936, is more than 5000. The Institute as yet has given no opinion on the efficacy of the treatment as the time is yet too short to judge, but there can be no doubt that it is entirely free from danger.

Parenteral inoculations are also being used in Hungary. Apart from the favourable reports of Wallgren, Heimbeck, and Park, and Kereszturi in Hungary, it is considered all the more useful as it can be used not only in infants but also in those a few years older, and the subsequent protection is said to develop in a high proportion of cases. B C G intracutaneous inoculations are also being used in Hungary. Dr. Oedoen Kovács, who first tried it in Szeged on 21 children, found that there was no great local reaction but that even with a single intracutaneous dose there was evidence of tuberculin sensitivity. Similar work was begun by the National Hygienic Institute in several rural centres in November, 1936, and in March, 1937, and Hungarian pædiatricians, encouraged by these good results, are hoping for an extension of parenteral inoculations.

TREATMENT OF SCABIES

Kulchar and Weininger have modified the treatment devised by Wernick in Germany and their experience of the new method has proved so satisfactory that several other dermatologists in Hungary are using it as the routine treatment of scabies. The method is to paint the whole area with a brush or a gauze pad soaked in the following solution: sodium thiosulphate 100, distilled water ad 250. After leaving this to dry for 15 minutes the skin is rubbed with a 5 per cent. hydrochloric acid solution, which is also left to dry for 15 minutes. Thereafter the whole procedure is gone through again and then the patient puts on clean underwear. On the next day the whole treatment is repeated in the manner described. A cure requires about 120 c.cm. of 40 per cent. thiosulphate of soda solution and about as much 4 per cent. hydrochloric acid. Dr. Hubert has used the method in the hospital at Nyieregyháza in various forms of scabies. Up to the present he has treated 45 cases, from the mildest to the most severe, some of them being complicated by extensive inflammation and pyodermic changes. The treatment was surprisingly successful in every case. Itching subsided after the first hour and completely ceased after 48–72 hours, when the lesions also healed. According to Hubert the advantages of this method are that: (1) It never causes inflammation of the skin requiring

after-treatment even in patients with very tender skins or in young children. (2) It does not soil clothes. (3) The period of disability is reduced to about 5 days. (4) The drugs used are not fatty or sticky and the patient's rest is not disturbed by them. (5) The drugs are odourless and patients can be treated in the hospital wards, whereas in the older method of treatment with Wilkinson ointment the offensive smell demanded isolation. (6) The cure is incomparably cheaper than any other hitherto employed.

TROPICAL MALARIA IN HUNGARY

Dr. Paul Végh of Debreçen University saw during last autumn six patients with tropical malaria. These cases occurred from July to November, which is the usual season for tropical malaria in Hungary. The incubation period after the anopheles sting was from 4–6 days, and then the first attack of fever supervened with shivering and a temperature of about 40° C. In characteristic cases a grave condition develops very soon with a big spleen which is doughy to palpation. The febrile period is considerably longer in the Hungarian cases than in the tertian form (lasting from 30–36 hours), and in from 10–18 hours a pseudo-crisis appears followed by the maximum temperature. The temperature chart sometimes shows a bizarre picture, with intermissions of 30–40 hours, in which it is striking that shivering is not repeated in most cases, and with fresh attacks of fever the patient wastes rapidly. It was characteristic of the patients observed by Végh that they did not feel any easier or fresher during the afebrile stages. In non-treated or malign cases prostration of a severe grade, apathy, and later somnolence and coma occurred. The clinical picture resembled meningitis or toxic abdominal typhus: rigidity of the neck, dilatation of the pupils, positive Babinski phenomenon, peripheral reflex deviations, and delirium were all observed. The patients lay in bed with a peculiar, apathetical, rigidly peaceful face (malaria comatosa, algida). Out of the six tropical forms observed in Debreçen by Végh two had profound coma. It was interesting that all six were sent to hospital with the diagnosis of typhoid.

UNITED STATES OF AMERICA

(FROM OUR OWN CORRESPONDENT)

PROPOSALS FOR THE IMPROVEMENT OF MEDICAL CARE

FOR the third time in its history the House of Delegates of the American Medical Association met in special session in Chicago on Sept. 16th and 17th to consider the proposals put forward for the improvement of medical care at the National Health Conference in Washington, July 18th to 20th. The following seven physicians were appointed to discuss with medical representatives of the federal government methods of coördinating health activities of private and governmental agencies: Dr. Irvin Abell of Louisville, Kentucky, president of the American Medical Association, Dr. Edward H. Cary of Dallas, Texas, Dr. Walter E. Vest of Huntington, West Virginia, Dr. Walter Donaldson of Pittsburgh, Pennsylvania, Dr. Fred Rankin of Lexington, Kentucky, Dr. Frederick Sondern of New York City, and Dr. Henry A. Luce of Detroit, Michigan. This committee will have for its guidance a report adopted by the House of Delegates which goes a long way toward conciliating the differences that have hitherto existed between the liberal and conservative elements of the profession.

The House of Delegates is now prepared to declare that "we advocate recognition of the principle that the complete care of the indigent is a responsibility of the community, the medical and allied professions, and that such care should be organised by local governmental units and supported by tax funds." Group hospital plans or "hospital service insurance" as it is now called should be expanded "along sound lines." The plans will remain "sound" so long as no medical care is included in the insurance for hospital service. The risk of catastrophic illness may be covered, however, by cash indemnity insurance so long as this is on a voluntary basis. Resolute opposition is still expressed to any plan of health insurance, which is described as "a complicated, bureaucratic system which has no place in a democratic state." The House of Delegates favours the establishment of a Federal Department of Health with a secretary who shall be a physician and a member of the presidential cabinet. They are also in favour of compensation for disability due to sickness. The government's programme for the extension of public health services is approved. However, the programme for extension of hospital facilities is questioned. The delegates believe that there is at present greater need of subsidy for existing hospital facilities than for the construction of more hospitals.

The care of the indigent sick is held to be primarily a local problem, best handled by the local medical society in coöperation with the relief authorities and similar agencies. If the cost of hospitalisation of the medical indigent is paid by federal or state funds, many hospitals now maintained on a voluntary basis would be assured of maintenance, an assurance of which they are now badly in need.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED SEPT. 17TH, 1938

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 0; scarlet fever, 1683; diphtheria, 1213; enteric fever, 45 (60 "expected"); pneumonia (primary or influenzal), 445; puerperal pyrexia, 175; cerebro-spinal fever, 17; acute poliomyelitis, 76; acute polio-encephalitis, 7; encephalitis lethargica, 6; dysentery, 40; ophthalmia neonatorum, 94. No case of cholera, plague, or typhus fever was notified during the week.

The incidence of poliomyelitis still remains almost stationary, the total poliomyelitis and polio-encephalitis cases combined being 83, 76, 82, 76, 83, 87, 63, 41, 29 for this and the previous eight weeks (working backwards).

The number of cases in the Infectious Hospitals of the London County Council on Sept. 23rd was 2535, which included: Scarlet fever, 545; diphtheria, 993 (carriers, 27); measles, 43; whooping-cough, 218; puerperal fever, 16 mothers (plus 8 babies); encephalitis lethargica, 274; poliomyelitis, 21. At St. Margaret's Hospital there were 22 babies (plus 11 mothers) with ophthalmia neonatorum.

Deaths.—In 126 great towns, including London, there was no death from small-pox, 5 (0) from enteric fever, 3 (2) from measles, 2 (0) from scarlet fever, 8 (1) from whooping-cough, 21 (3) from diphtheria, 56 (11) from diarrhœa and enteritis under two years, and 15 (6) from influenza. The figures in parentheses are those for London itself.

Hendon, Thurrock, Liverpool, Ipswich, and Exeter each reported a case of typhoid. Fatal cases of diphtheria were scattered over 14 great towns, 3 at Liverpool, 2 each at Preston, St. Helens, and South Shields. Liverpool had 8 deaths from diarrhœa, Birmingham 6, Leeds, Newcastle-on-Tyne, and Sunderland each 3.

The number of stillbirths notified during the week was 250 (corresponding to a rate of 39 per 1000 total births), including 31 in London.

GRAINS AND SCRUPLES

Under this heading appear week by week the unfettered thoughts of doctors in various occupations. Each contributor is responsible for the section for a month; his name can be seen later in the half-yearly index

BY A VOICE IN THE WILDERNESS

I

THIS wilderness of modern times has many crooked paths. True, we do not lack prophets to show us the way, but their very multitude suggests that some of them are false. We look in vain for an inspired Moses to lead us to the promised land. We forget that, on his ascent into Mount Carmel, Moses slipped a chisel into his pocket. He succeeded by using his intelligence. We have no excuse for not following his example. Let us go into a high place and make a preliminary survey of the kingdoms of the world.

The sight, I fear, is not an edifying one. Increasing numbers of people appear increasingly unhappy. Poverty sits next to potential plenty. Capital lies idle while millions are out of work. Repetitive jobs convert their unhappy possessors into nervous wrecks. The taste of the female population is perverted by advertisement, the cinema, and the picture press. The new mental squalor of the suburbs destroys the countryside in an unplanned individualistic attempt to clear the slums. Governments vacillate in attempts to reconcile vested interest with public good. Those rulers who do not make up their minds choose temporary expedients which seem to lead all the quicker to disaster. Civilians are threatened by scientifically planned destructive warfare. Faith in the virtues of self-negation, benevolence, religion, and patriotism have been shattered almost beyond recall. Life for most of us is a perplexing business without standards, plan, or aim.

The tools which have fashioned this farcical tragedy were the first which came to hand. Chief among them were private enterprise, competition, and laissez-faire, an undue respect for tradition, a classical education, an unadaptable religion, and an ill-defined obscurantist philosophy. Whatever their original virtues, they are now obsolete. They have proved useless in dealing with uncontrolled scientific technology, dominated by business and nationalist interests. Inevitably also, laissez-faire and the profit principle have extended from business to private life, and have disposed of the moral framework which made communal civilisation a possibility.

That is the picture. What is to be done about it, and who is to do it?

* * *

I propose to begin by making three propositions:—

1. The most convenient aim for anyone setting out to alter and improve the world is that of Jeremy Bentham—"the production of the greatest happiness of the greatest number of people, each individual to count as one." The ethically minded may consider goodness a more desirable aim. Unfortunately, criteria of goodness vary from country to country, class to class, church to church, and from individual to individual. Conscience is not a congenital characteristic but a social desirability, produced by education and environment. Happiness, on the other hand, is a well-recognisable state both in ourselves and others, and is, in fact, the yard-stick actually used by all practical good-doers. Nowhere is this better shown than in the ethics of medicine.

2. In whatever proposals we bring forward, we must allow for the fallibility of human nature. It is now 2300 years since the death of Socrates, and 1900 since the death of Christ, yet the principles of neither have fundamentally altered human conduct. The pre-Christian Roman Empire exhibited a degree of religious and racial toleration which the world as a whole has never since accepted. The petty dishonesties of Samuel Pepys find exact parallels in the City of London to-day. Power corrupts the modern dictator just as it corrupted Plato's philosopher kings in Syracuse. Good advice will continue to influence the suggestible, and fall upon the deaf ears of those who know best. Emotion will still sometimes defeat reason. No amount of precept will make all men good. If the world is to be made happy in spite of itself, we must accept and allow for human stupidity, cupidity, pomposity, and sloth.

3. If we are to find cures for the ills of society, we must use new and better tools. In the past the human race has treated these ills by actions based on thought and talk, partly rational and partly emotional—with lamentably little result. Fortunately, we have already in our hands a tool, which, when applied to more material problems, has proved uniformly satisfactory. That tool is the scientific method. To it we owe the astonishing advances in power technology, the use of materials and therapeutic medicine which the last century has witnessed. Already it has begun to solve problems where philosophy has proved sterile—in the study of the human mind. We have, then, at least an a priori case for trying it out in the study of the actions of society.

* * *

The scientific method is a way of examining phenomena to find out the truth about them. The truths discovered make no pretence of being absolute. Far from it. Scientific truths must invariably be regarded as provisional only. The instinctive basis of the scientific method is curiosity—shown in the developing child by sensory exploration of the environment, and later verbal questioning. Next comes the stage of disagreement, when the child ceases to take the opinions of others on trust. However desirable this phase, it should be transitory. The adolescent has to learn that parental opinions are not of necessity wrong. The family's statements must be subjected to the same impartial scrutiny that would be extended to information from outside. In a word, he has to learn to believe according to the evidence. But his hardest lesson is yet to come. He has to be ready to alter his opinions when new evidence is produced. When he can say to himself, "I am ready to admit myself wrong on any point when shown to be by the evidence," he may be said to have entered upon scientific intellectual maturity. With this as our criterion, how few of us can regard ourselves as intellectually mature. This pliability of mind of the true scientist leads those who approach problems with preconceived ideas to regard him as a fickle creature, a time-server who does not stick to his principles. They fail to appreciate that it is only by admitting his errors that he can save his soul. Their emotional loyalties are to superficialities; his is to something deeper. A social scientist may regard conservatism, socialism, or communism as expedient, but their absolutism prevents him regarding them as scientific.

At once a question arises. Are scientists really ready to admit themselves wrong on any point when shown to be by the evidence? I find their behaviour

contradictory. In their work in their laboratories or libraries they are. Outside, in the everyday world, they are not. All too frequently they are political bigots or atheistic zealots, or just crotchety, obstinate people. My own provisional explanation is this. For eight hours a day, that is, for half the time they are awake, they are by their occupation forced to be more mentally honest than the accountant of the Bank of England. And they cannot keep it up all the time. One is, as a rule, wise to believe scientists when they are speaking of their own subjects, but to be very careful before accepting their opinions on politics or art or religion, or even medicine. Once more, we must allow for the fallibility of human nature. If the scientific study of society is to be unbiased, it must be a major and not a spare-time job. The technique of the scientific method may be summarised thus:—

Observation → Repeated observation → Comparison → Inference → Hypothesis → Further observation and experiment → Theory → Verification or disproof → Provisional fact.

It will be seen that the process is both analytical and constructive and that every step is checked up against fact. Experiment is a late stage, and is not an essential in the sequence. Its place may be taken by further observation. Darwin's theory of natural selection, the discovery of the solar system, and, nearer home, the clinical pictures of all diseases were worked out by observation alone. Because the study of history needs no microscope it is not necessarily unscientific.

Although, while solving a problem, the scientist is disinterested, the problem itself may be, and in fact usually is, utilitarian. Science arises in response to human needs. Agriculture demanded the calendar. So numbers were invented and mathematics was born. Navigation needed cartography, and the compass was devised. Printing called for spectacles, and the laws of optics were discovered. The accumulation of provisional fact and the satisfaction of human needs cannot be separated. As Prof. Hogben remarks: "Science is an ordnance map to direct our efforts in changing the world."

* * *

The persons engaged in studying human society are the economists and sociologists. There is a widespread belief that economics is at present a bastard or pseudo-science. This belief has, I think, a substantial basis. The economist labours with heavy odds against him. If he sets out to study, say, wealth, he is at once subject to an emotional bias. If he is a rich director of railways, he wants to keep what he has. If he is a relatively poor professor, his wife wants more. It is as though a doctor, called upon to advise universal sterilisation for schizophrenia, had himself recently recovered from an attack. But the economist's position is still worse. He is seldom trained in the methods of natural science. He lacks the physicians' opportunity of studying human nature. His early upbringing usually gives him an emotional political bias. Further, constructive economic programmes are left to enthusiastic amateurs like Karl Marx and Mussolini. Conservative and socialist economists urge precisely opposite remedies for the cure of the same social illness. It is small wonder that natural scientists, and even practical politicians, place less reliance on currency experts than on public health advisers. I see little hope of help in this sphere until its practitioners receive a gilt-edged and adequate income, devote their whole time to their work, forswear politics, learn natural science, and study society as an aggregate of individuals with similar species requirements rather than as a complicated purchasing machine.

* * *

Doctors, as a whole, dislike politics. They are well content to be left alone to get on with their job. But their job is changing. Till perhaps thirty years ago it was defined as the prevention and cure of disease. Nowadays we flatter ourselves that it has also a positive aspect—the production of health. Further, we consider that health includes both body and mind. The production of physical health is a hard enough task. We are still painfully ignorant of the factors which keep people healthy. In the absence of positive knowledge, the National Fitness Campaign must be looked upon as a Sandowesque attempt to make the nation muscle-bound. But the production of mental health is far harder. The entire environment may influence the mind. If we really intend to go forward with the job, we must realise that we are about to offer the human race gratuitous advice as to how it shall conduct its every action. We shall have to suggest whom it shall choose for its parents, what its nursery shall be like, what schools it shall go to, what university, if any, it shall attend, what job it shall do, what leisure it shall have, what books it shall read, what games it shall play, what films it shall see, what house it shall live in, what mate it shall take, how many children it shall produce and how often, when it shall retire, and under what circumstances it shall die. The Fascist or authoritarian atmosphere about so vast an undertaking can only be avoided if we remember that medicine does not compel but advises. The doctor's duty is to show the world how it can attain mental health. The final decision will be with our patients.

So, in spite of themselves, doctors have taken on the job of social architects of the future. In this they will have to coöperate with, and at times instruct or oppose, the nursery maid, the school-teacher, the don, the business man and industrial expert, the journalist and the publisher, the film producer, the architect, the politician and the parson, not to mention the raw material, the people in their homes. What are the doctor's qualifications?

* * *

After ten years' observation I have reached the conclusion that Robert Louis Stevenson's estimate of doctors is wrong. Like the rest of humanity they have their good and bad points. Let us look first at the good ones.

A medical training is both scientific and practical. The doctor provides a link between the pure research worker and the general public. The practice of medicine demands constant observation, and, more important, the good doctor has constantly to admit himself wrong. Experience with patients gives a practical knowledge of human nature and of the troubles of home and family life; doctors come to recognise that physical, intellectual, and moral weakness call for constructive activity rather than condemnation and punishment. Lastly, medicine makes almost all doctors utilitarians. However mercenary they may become they still do their best for their patients.

I do not find doctors either more or less honest than the rest of humanity. Their honesty seems to be roughly proportional to their financial security. A professor of medicine, a prosperous G.P., or a medical officer of health can afford to let the future look after itself and practise the golden rule. A

struggling young consultant, with a Harley-street rent, cut-throat competition, and no private income, can hardly be blamed for wishing his rivals dead, and a second-rate man occupying the next vacancy on the staff. The panel doctor knows that if he does not issue certificates for "nervous debility" and "gastric neurasthenia," his patients with their capitation fees will go elsewhere. Similarly, doctors seem to be neither more nor less lazy than their fellows. The diligent do as much as they can, the idle as little as they need. With regard to their average intelligence, I hesitate to generalise. Their very numbers suggest an average below that of the other professions, but the brains of the best of them are, I suspect, as good as any.

* * *

Let us turn now to the bad side of the picture. First among our besetting sins I place pomposity. Admittedly, the rôle of the priest is often foisted upon us by a credulous public. But pomposity is a knowledgable cloak to hide from ourselves our own ignorance. Next, we have a vested interest in excessive caution, amounting at times to complete negativism. In vital matters, such as their own health, most people play for safety. They feel that a doctor with orthodox social views is likely to be a sound man at his job. So the doctor tends to keep any unusual opinions he may hold to himself. Next, doctors seem as a whole to lack creative ability. For this, I find three causes. Medicine attracts the analytically minded; the great number of facts to be remembered leaves little room for imagination; and lastly, diagnosis is the fitting of diseased patients into existing disease pictures. Medicine is like a crossword puzzle with the clues given and only a limited number of possible solutions. Finally, odd though it may seem, doctors all too often lack a wide knowledge of outside affairs and the ways of the world. This I attribute to the all-absorbing nature of their job, a tendency to talk shop when off duty, and the habit of patients to put on a special face for the doctor's benefit. The greatest rogue, once inside the consulting-room, feels it is in his own interest that the doctor should think well of him, and that he should also speak as much of the truth as is compatible with this.

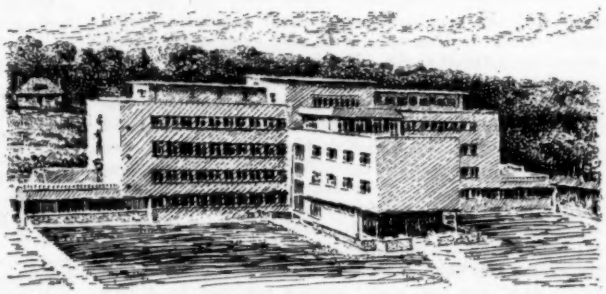
Psychologists, looked at as mental architects, have certain special deficiencies of their own. Many of them have taken up psychology in their student days and have little experience of the world and less of general medicine. They often lack those higher qualifications which at least guarantee a minimal intelligence quotient. They are attracted to psychology not by a disinterested curiosity or a humanitarian aim but because in other people's conflicts they find satisfaction of their own. Lastly, they disguise their ignorance with long words, and prefer abstract philosophy to practical reality.

* * *

Of course, like all generalisations, my views on doctors are subject to many exceptions. As a scientist I am bound to admit that they are provisional and may be wrong. Because, however, exceptions exist, they are not necessarily invalid. If they are true, the following reforms suggest themselves. Inadequate mental material should be excluded from the medical profession at the earliest possible moment. Doctors should cultivate always a scrupulously scientific outlook. The training given, especially to the better students, should encourage original thought rather than efficient feats of memory. Doctors should have a wide non-medical experience of life both before and after qualification. A considerable general medical experience should be compulsory before any speciality, and above all psychology, is taken up. Steps should be taken to ease the financial burdens of the young consultant, and to give the panel practitioner greater safeguards against the dishonest work-shy patient. Lastly, if we really intend to help the world to be healthy minded, we must create new facilities for research into the factors governing human happiness.

THE NEW MEDICAL SCHOOL AT ABERDEEN

WITH the opening of the new medical school on Wednesday by Lord Dawson of Penn, Aberdeen has now concentrated on one site substantially all her medical teaching and hospital services. Apart from anatomy and physiology which is still to be taught at Marischal College and training in the common fevers, still given at one of the municipal hospitals, all other subjects will be dealt with at the new school and the hospitals which surround it. In the school itself there has also been a merging of forces. Formerly each branch of medicine had its own lecture-rooms, animal houses, and museums; now there are common lecture-rooms and laboratories and a single museum, where all aspects of a particular condition may be seen together. The new building is four-storeyed and follows the modern style, as may be seen in the accompanying sketch reproduced from the Students' Guide of August 27th. On the top floor are the research departments, which include a well-equipped experimental operating theatre and kymograph room. On the second floor materia medica, forensic medicine, and public health will be taught, while for leisure there is a staff room and roof-garden which command fine views of the city and the sea. On the first floor are the medical and surgical departments and a large museum, and on the ground floor the common lecture-rooms and laboratories for the study of medicine, pathology, and bacteriology. In the main lecture-room provision is made for the showing of films and slides and a projection room and a photographic department emphasise the importance of this method of teaching. There is in addition a special room for photo-micrographic work. The building is already partly occupied and will be in order for the start of term.



SURGICAL INSTRUMENT MANUFACTURERS' ASSOCIATION.—The annual dinner of this association will be held at the Holborn Restaurant, London, W.C., on Friday, Oct. 28th, at 7 P.M.

CORRESPONDENCE

TREATMENT OF INFANTILE PARALYSIS BY CONVALESCENT SERUM

To the Editor of THE LANCET

SIR,—Prof. Girdlestone believes that the statistical evidence for and against convalescent serum is inconclusive. Certainly one can draw no conclusions whatever from the statistics he quotes in its favour in your issue of Sept. 24th. They relate to two relatively small groups of cases (all with positive spinal-fluid findings)—namely, (1) those who had serum within 36 hours of onset, and (2) those who had serum after 36 hours, *or after paralysis*, or not at all (the italics are mine). It transpires that in the latter group there were more deaths and fewer recoveries without paralysis than in the former. It would seem incredible that any other result could be reached. The serum-treated group contains patients early in the disease who may or may not subsequently escape paralysis—irrespective of the value of serum. The "control" group contains, amongst others, patients who cannot possibly escape paralysis because, by definition, they already have it. Such patients are, apparently, automatically put in the "control" group, to its inevitable detriment. It seems to me to be equivalent to giving serum to a group of persons some of whom may be run over by a motor-car in the next few days and, a little later on, to another group, some of whom have been run over already. Is it surprising that the latter group gives a less favourable result than the former?

In addition, statistics included in the papers quoted by Prof. Girdlestone show that both the fatality-rate and the incidence of residual paralysis varied considerably in Manitoba with age, even when serum was administered early. For instance at ages 0–4 the recorded fatality-rate for all cases was 1·2 per cent., at ages 10–14 it was 8·3, and at ages 15–19 it was 15·5. The incidence of residual paralysis on those who lived was 26 per cent. at ages 0–4, 17–18 per cent. at ages 5–14, and 22 per cent. at ages 15–19. When serum was administered within 36 hours the fatality-rate was 1·5 per cent. at ages 0–14 and 8·5 at ages 15 and over, and the percentages with residual paralysis were 5·4 and 10·2. The upshot is clearly influenced materially by age. Yet no evidence whatever is given that the two small groups referred to above were in fact equivalent in their age distributions. Lastly, the possible, and sometimes probable, statistical fallacy in comparing results with patients first treated on different days of disease is not discussed.

There is offered, in fact, no evidence at all that these two groups are in pari materia, and some evidence that they are certainly not. The further trials appealed for by Prof. Girdlestone will not be very informative unless they are conducted and analysed more efficiently.—I am, Sir, yours faithfully,

A. BRADFORD HILL.

London School of Hygiene, W.C., Sept. 26th.

SULPHANILAMIDE IN THE DERMATOSES

To the Editor of THE LANCET

SIR,—The suggestion in recent issues that members of the Sulphonamide group have been employed with success in the treatment of certain skin diseases, leads me to recall the following case.

In January of this year I was consulted by a gold-mining engineer from West Africa who complained of a feeling of unfitness and lassitude, together with a skin eruption accompanied by intolerable nocturnal itching. Previously he had been a very strong and fit man. The general poor health was found to be due to a somewhat advanced grade of chronic intestinal stasis. After three months of active detoxicating treatment for this condition his general health became normal and his full vigour returned, but he had severe recurring bouts in various parts of the body, of an eruption which was ultimately diagnosed as herpes iris. All kinds of treatment were tried, and finally three weekly intravenous injections of T.A.B., which gave rise to high temperature, temporary delirium, and a sharp rigor. The skin condition, however, although improved, kept on recurring. The last time I saw him he told me that a friend of his with a somewhat similar condition had been cured by a drug called Proseptasine, and did I mind if he tried it. I gave him a prescription for this and ordered three tablets to be taken daily. He then went to Switzerland and I received a letter from him in which he says: "The Proseptasine tablets have worked wonders—within a day or two the spots cleared up, and no new ones are coming now. The larger ones still irritate, but are gradually clearing up." The "larger ones" he mentions were deep lesions on the buttocks, the result of the herpes iris aggravated by violent scratching.

One case is little or nothing to go on, but the result has been so striking and so rapid after the failure of many other treatments that it may point to the desirability of further investigation in similar cases or, perhaps, in a good many skin conditions which do not readily respond to the usual methods of treatment.—I am, Sir, yours faithfully,

A. GRAHAM-STEWART.

Ulster-place, N.W., Sept. 22nd.

REX *v.* BOURNE

To the Editor of THE LANCET

SIR,—Your valuable leading article on Mr. Roland Burrows's comments on the Bourne case has reminded me of an experience which illustrates the dangers of allowing important medical decisions to be made on the basis of unchecked statements.

Some years ago I was asked to advise a girl of about 20 who suspected she was pregnant by her fiancé. As there was no real obstacle to their marriage she was very little worried and went on studying for an examination, pending the fact of pregnancy becoming certain. To my amazement I was told a few months later that an abortion had been arranged on the grounds (stated in writing by the doctor who was about to operate) that the girl had been raped and the child was certain to be mentally defective! The girl then admitted to me that her fiancé's means had proved nebulous and his family hostile. Marriage being no longer desired by either party the girl and her mother had gone to an obstetrical specialist and announced that she had been "assaulted by a degenerate." So far as I could gather no steps whatever had been taken by the doctor to ascertain the real facts.

Your leading article hardly seems to recognise that what a patient says to her doctor may represent neither the actual facts nor what she thinks are the facts but merely what she hopes he will believe. Little harm is done at present even if he does believe her, for few doctors would risk drastic action without supporting evidence. It would be a deplorable thing, however, if the law placed an unborn infant's life at the mercy of a doctor's credulity.

It will be extremely interesting to note how the proposals (which Mr. Burrows supports) for defining

medical reasons by Act of Parliament will materialise. Anything as inelastic as an Act seems a singularly unsuitable medium for defining such a delicate matter as the point at which the danger to a mother's health outweighs the value of an unborn infant's life. It may well be that the enthusiastic advocates of abortion law reform will find that their last state is worse than their first.

I am all for breaking laws if there is no other way of establishing a great principle, but the trouble here is that Mr. Bourne was not clear and consistent enough as to the principle he wanted to establish. One would hesitate to say, as an Irish newspaper said of General Franco, that he is "unworthy of the grand old name of rebel," but he has hardly realised the snares of that high calling. Meanwhile Philistines like myself may well rejoice that he has made the confusion in his own ranks worse confounded.

I am, Sir, yours faithfully,

Gray's Inn, W.C., Sept. 26th. LETITIA FAIRFIELD.

THE ARCHES OF THE FOOT

To the Editor of THE LANCET

SIR,—I read with interest the article by Mr. Bruce and Dr. Walmsley in your issue of Sept. 17th. Their account of modern views on the arches of the foot is good and they make a definite contribution to our knowledge of these structures in the fœtus, but as far as treatment is concerned the article is incomplete in one place and rather misleading in another.

The omissions to which I refer are in the section on the surgical treatment of what is referred to as forefoot strain. To carry out a tenotomy of the extensor and flexor tendons, without adopting any further corrective procedure than straightening them and applying a plaster-of-Paris case for some weeks, is to risk weakening the foot still further. Such an incomplete operation is not advisable when the power of flexion of the toes can be utilised to regain for them, by either of the following procedures, part of their properties of weight-bearing and propulsion in the final stages of the step in walking :—

1. A tenotomy of the extensor tendons combined with multiple arthrodesis of the interphalangeal joints, as described by Mr. C. Lambrinudi. This is now an established procedure and has been found to be very helpful in cases of forefoot strain.

2. A tenotomy of the extensor and flexor tendons followed by a transplant of the flexor tendons into the extensor expansions. In this way a substitution for the action of the interossei and lumbricals is obtained.

Prof. Girdlestone showed several patients treated by this second method at the meeting of the British Orthopædic Association at Oxford this year. These were follow-up cases, completely unselected, and most of them had had a fairly severe degree of pes cavus in addition to the clawing of the toes and metatarsalgia. With few exceptions they expressed a relief of symptoms and some had been walking for a sufficient time to demonstrate the action of the flexors of the toes at the metatarso-phalangeal joints.

The part of Bruce and Walmsley's article which I considered rather misleading was that on the treatment of "longitudinal foot strain." This condition, if left untreated, is a progressive disability. Three main clinical stages are recognised : (1) the initial strain, (2) a stage due to adhesions but *without* definite osteo-arthritis, and (3) a stage of definite chronic tarsal osteo-arthritis. In order to apply the appropriate treatment it is necessary to consider these three stages in more detail.

1. It is very seldom that patients present themselves at the stage of initial foot strain as it is usually mild and associated with repeated traumatic influences (often occupational) rather than with any single definite accident. The most evident clinical features are pain, swelling, heat, and limitation of movement. Pathologically the tarsal joints are inflamed and a certain amount of synovial effusion occurs. Rest from any movement that seems likely to have caused the strain followed by graduated exercises are the main points in treatment.

2. The bulk of the cases are seen in the stage of adhesions without definite osteo-arthritis. Painful limitation of movement particularly on inversion of the foot is the most conspicuous clinical finding. It is reasonable to assume that the initial synovial effusion has organised and formed adhesions, no doubt assisted by incorrect treatment such as arch-supports and stiffening in the shoes. The main object of treatment at this stage is to break down these adhesions ; this is done by manipulation and if it is followed by a course of graduated exercises and massage will be found very effective.

3. The tarsal osteo-arthritis, which is the last stage of the condition, is characterised by rigidity, pain on movement, lipping, and osteophyte formation. It is often seen also as a sequel to conditions other than foot strain.

In either of the last two stages a variable degree of deformity (flattening of the longitudinal arch) is usual, but is a factor of secondary importance bearing an inconstant relation to the symptoms. The initial stage is described by Bruce and Walmsley, but the second stage is almost ignored in spite of the fact that it contains 90 per cent. of the cases as seen in an orthopædic out-patient department. The place allocated to manipulation is consequently very misleading, for it is in this large group that it is most useful. The statement that "In chronic arthritis however, just as in chronic arthritis at other joints, considerable improvement may result from a correctly applied and well executed manipulation" is an optimistic view, shared by very few orthopædic surgeons. Once chronic tarsal osteo-arthritis is established, any improvement due to manipulation is not likely to be lasting and probably the condition is best treated by a mid-tarsal arthrodesis.

I am, Sir, yours faithfully,

Norwich, Sept. 26th. G. K. MCKEE.

NEURASTHENIA FROM A NEW ANGLE

To the Editor of THE LANCET

SIR,—For some time past I have noted that streptococcal throats are frequently followed by one or all of the following symptoms : (1) depression ; (2) weakness ; (3) loss of energy ; (4) loss of interest. Of these symptoms depression is the most noticeable and often the patient is unable to carry on a conversation without shedding tears. On this account he is wrongly diagnosed as neurasthenia.

In my opinion this syndrome is one of the sequelæ which follows infection by the streptococcus. There is first of all the primary streptococcal infection, usually a sore-throat. This may be slight, so slight as to pass unnoticed. Then there is the lag period of from twenty to thirty days, and then the depression symptoms come on. There is a great similarity to another effect of streptococcal infection—nephritis. In both we get the primary sore-throat, in both we get the lag period, then we get the streptococcal toxin bringing about a vaso-spasm which, if it attacks the kidney, causes nephritis but, if it attacks the vessels in the brain, brings about the symptoms I have mentioned. If these cases are left untreated

they take three or four months to recover. The sulphanilamide group of drugs, excellent as they are in the acute primary stage of the streptococcal infection, are of little value once these symptoms are established. Tonics are useless and sedatives, though helpful, in no way cut short the attack. For some time I have tried small doses of streptococcal antitoxin (1·5 to 2 c.cm. once weekly) and have seldom failed to clear up the symptoms in two or three weeks. The reaction to the injection is often very marked.

I fear I can give no laboratory proofs of these facts which I have observed, nor do I for a moment assert that all cases of neurasthenia are caused by streptococcal infection, but from clinical observation I feel sure that many cases of so-called neurasthenia are really suffering from the effects of streptococcal infection, and that their recovery can be expedited by the injection of small doses of streptococcal antitoxin. I am, Sir, yours faithfully,

Habrough, Lincolnshire, Sept. 26th. J. H. WARD.

DETERMINATION OF BLOOD VOLUME

To the Editor of THE LANCET

SIR,—The estimation of blood volume is sufficiently difficult and arduous to limit very dangerously the number of cases in any series, but Dr. Izod Bennett and his collaborators must have acquired a unique experience in this work (see *Lancet*, Sept. 17th, p. 652). So important is it to establish a satisfactory normal for the blood volume that my own difficulties and experiences may be of as much interest to these writers as their criticism would be to me.

The dye I have been using was vital red but I did not notice any undue speed of elimination of this dye. Thus in one case the colorimeter readings in specimens taken 3 and 30 minutes after injection were equal within the limits of the matching of the colour. Of the normal cases of both sexes investigated 27 in all were examined, but only the last 15 have been used in this commentary. This shows the difficulties that have to be overcome before this method can be a practicable one for clinical use.

Accuracy of the method.—This is probably surprisingly high; much more so than would be estimated from glancing at the normal range of variations. Thus in a second estimation on the same case after a five-day interval the figures obtained were 80 c.cm. of blood per kg. body-weight and 79 c.cm. per kg. I feel one should stress more forcibly than do the present writers the fallacy of using solutions even moderately cloudy. Unless the colorimeter reading is very near 100 per cent. (and hence the fluid columns almost equal) the reading is in my opinion valueless. The eye is distracted by brightness as opposed to pure colour; many of my early results were discarded owing to this and to attempts to remove it with kaolin.

Variations in the normal.—Though the majority of my readings fell round the average as found by Keith, Rowntree, and Geraghty, I should be interested to know whether Dr. Bennett has had occasionally much lower readings in apparently accurate estimations. I have two of 54·3 c.cm. and 64 c.cm. per kg. My highest reading was 90 c.cm. per kg.

It is very interesting that the lowest figure of 54·3 c.cm. was in a woman of 21 years of 7 st. weight and having nothing more than visceroptosis, while the highest of 90 c.cm. was in a woman of 28 of 7 st. weight with a bronchial cyst. (Though not really bearing on this subject it is of interest to mention that a volume of 47 c.cm. per kg. in an 8 st. female was obtained with advanced carcinoma of the stomach—though on external examination she appeared moderately well and she was not bedridden.)

This wide variation in the normal would account for large differences in total blood volume. Thus with a range of 78–99 c.cm. per kg. a 70 kg. subject might vary almost 1¼ litres. If my low figures have been found by other workers this variation would be all the more striking.

Second estimation within a few hours.—I was surprised at the accuracy of the results which Dr. Bennett and his collaborators have had when checked up by the ingenious method of cell volume estimation. My experience has shown fantastic inaccuracy if the second control serum has any trace of dye left in it. I believe that this error can be proved mathematically. Such inaccuracy is commented on by Keith in his original paper in 1917 and might justify close mathematical scrutiny.

I am grateful to Dr. Bennett and his collaborators for their explanation of the conception of total cell volume as opposed to blood volume. Should further work support the accuracy of this method their paper should be a landmark in medical investigation. I am, Sir, yours faithfully,

JOHN CHARNLEY.

Salford Royal Hospital, Sept. 19th.

THE USE OF SUGAR AS A HÆMOSTATIC IN TONSILLECTOMY

To the Editor of THE LANCET

SIR,—In your last issue (p. 751) Mr. Guthrie inquires what experience your readers have had with the use of sugar or of pectin as hæmostatics. Of the latter I have had no experience. The former I have been using for five years in the form of a 50 per cent. solution of glucose. On one occasion in a cottage hospital I used golden syrup. I have come to regard glucose as an extremely valuable hæmostatic; and advised its use in "Emergency Surgery" (2nd edition, 1936).

I am, Sir, yours faithfully,

Clifton, Bristol, Sept. 23rd. E. WATSON-WILLIAMS.

REMOVAL OF BULLET FROM THE HEART

Dr. G. H. Buck sends us the following account of an unusual operation performed by his uncle, the late Mr. Howard Buck, F.R.C.S. The patient is still alive and well.

A man of 23 was admitted into the Second Western General Hospital during 1916 suffering from a penetrating wound of the chest, and suppuration in the pleura, which was drained. A radiogram on Oct. 8th showed "a foreign body two inches deep under the junction of the 5th rib and its cartilage; the foreign body moves with respiration, and with the heart beat." Three weeks later the patient complained of severe pain in the precordial region. This continued for two weeks and became steadily worse, so that it was decided that an attempt should be made to remove the foreign body. This was done on Nov. 18th. The method of approach was that adopted by H. W. Allingham for draining the pericardium (*Lancet*, 1900, **1**, 693). A vertical incision was made from the junction of the 4th costal cartilage with the sternum to an inch below the junction of the 8th costal cartilage with the sternum. The 4th to 8th costal cartilages were divided and held back by retractors, thus exposing pleura, pericardium, and diaphragm. The pleura was pushed to one side, and the point where the pericardium and diaphragm became one was incised. This gave access to the interior of the pericardium. The bullet was lying encapsuled between the inferior vena cava and the right ventricle, just at the point where they met. After incision of the capsule the bullet was easily extracted. The pericardium was sewn together, and a tube inserted down to, but not into, the pericardium. Five days later the tube was removed and the wound healed without further eventualities. The patient returned to his depôt six weeks later.

PANEL AND CONTRACT PRACTICE

A Census of Incapacitating Illness

APPROVED societies admitting members in England, Wales, or Northern Ireland are being asked to furnish particulars of insured persons who have been continuously incapacitated for certain periods. There is a separate inquiry for Scotland, but Scottish societies approved for other countries are to be asked for particulars about members in those countries. The inquiry covers (1) all insured persons who complete twelve months of continuous incapacity in a certain seven-week period; (2) all members who complete seven months of continuous incapacity in a certain six-week period; and (3) fifty per cent. of the members who complete three months of continuous incapacity in a seven-week period. A special form of reference to be completed requires a reply to the questions (*a*) whether or not the member is in hospital and, if so, the name of the hospital and the date of entry, (*b*) if no benefit is paid the reason why: is the member in receipt of compensation, is benefit suspended on account of arrears, has he no dependants, and so forth. The societies are not to notify any such member that he may be called for examination because in fact it may not be found necessary to call him. Nor is the society to refer to the insured person's doctor. The divisional medical officer will communicate with the insured person as may be necessary and will obtain a report from the doctor; he will then decide whether or not an examination of the insured person should be made. This special inquiry is not, of course, intended to restrain approved societies from referring other suitable cases to the regional medical staff in the usual way.

Resignation After the Event

A firm of solicitors sent an insurance committee a document signed by a doctor giving a month's notice of his intention to resign from the medical list and nominating a successor. As the document was not dated the insurance committee returned it for completion, when it appeared that the doctor had gone to India. On investigation it was found that the successor had been acting as the doctor's assistant without the consent or knowledge of the insurance committee. The doctor had signed the notice of intention to resign during March; he had had to leave England early in April on account of his health, and at the time of leaving he did not know whether the proposed successor would be able to buy the practice or would act as his locum tenens, the sale being eventually completed in his absence. This doctor committed a breach of at least two of the terms of service. A practitioner may give notice to the committee at any time that he desires to withdraw his name from the medical list and his name will be removed at the expiration of three months or of a shorter period if the committee agrees. Most committees will accept an early resignation if a practitioner can show reasonable cause, but obviously they cannot accept an antedated resignation. Again they cannot antedate an admission to the list, and so a successor must join the list not later than the date as from which he is to succeed. A practitioner must not, except as a temporary arrangement, employ an assistant to attend his insured patients without the previous consent of the committee, and, what is so often forgotten, he must not absent himself from his practice for more than a week without first informing the committee and telling them who is to be responsible for his practice while he is away.

Payment for Medicines

The London insurance committee has been dealing with the case of an insured person who told his doctor that he was no longer entitled to medical benefit and obtained treatment as a private patient. Learning later that his title to benefit had not yet expired he applied to the committee for a refund of what he had paid. Many insured persons seem to imagine that insurance committees have funds from which such applications may be met and have no idea that their doctor will be called upon to refund the amount. If treatment is obtained voluntarily as a private patient, and the committee decide to allow the application, the refund must come from the practitioner's remuneration. If the patient is not on the doctor's list the doctor receives the remuneration to which he would have been entitled if the patient had been treated as a temporary resident, together with the value of any medicines he has supplied. But if the patient's name is on the doctor's list, even though the patient admits telling the doctor he was no longer insured, the doctor gets no credit. So far as capitation fees are concerned this is quite proper, for it must be assumed that the treatment given would have been identical whether for a private or for an insured patient, but if the doctor has provided medicine there is no provision for his being credited with the cost of it. In the case in question the committee took the view that the practitioner was misled by the insured person's statement and ought not to suffer the loss of the cost of the medicines supplied. Application is therefore being made to the Minister of Health for his consent to the value of the medicines being refunded to the doctor and charged against the committee's general purposes fund.

OBITUARY

SIR ANDREW MACPHAIL, M.D. McGill

Sir Andrew Macphail, professor of medical history at McGill University, and one of Canada's most distinguished literary figures, died at Montreal on Sept. 23rd at the age of 74. He was the son of William Macphail, a farmer of Inverairie, Prince Edward Island, and in his Scots accent and faith he carried through life the marks of his Highland descent. He was a student first at Charlottetown, P.E.I., and then at McGill, where he took his M.D. in 1891. After a time at the London Hospital he became professor of pathology at Bishop's College, Lennoxville, and later practised in Montreal. In 1907 he was appointed professor of medical history at McGill. In 1914 he went to France with a McGill unit, the Sixth Canadian field ambulance, and served at Canadian G.H.Q. He was knighted for his services in 1918, and in 1919 awarded the O.B.E. Soon after the war an accident that impaired his eyesight ended his purely medical work.

As a student Macphail worked as a reporter for the *Montreal Star*, and after he qualified he contributed largely to medical journals. Ample private

means allowed him to exercise his literary talents to the full, and in the years before the war he edited the *Canadian Medical Association Journal* and the *University Magazine*. He wrote on a variety of subjects. His "Essays in Puritanism" and "Essays in Fallacy" established his reputation as a writer, and he was capable of forceful and trenchant argument on behalf of social causes that moved him. In 1916 he published an anthology, "The Book of Sorrow," and in 1918 a life of his friend Colonel John McCrae. After the war he wrote much of the medical section of the Canadian official history of the war, and, in his "Three Persons," reviewed the autobiographical works of Sir Henry Wilson, Colonel House, and T. E. Lawrence.

To many people Macphail seemed rather unapproachable, for he was shy and retiring and slow to make friends. His attitude to life resembled that of the sixteenth-century Covenanters, and he combined their religious devotion (he was a Macdonaldite) with a broad general liberality. In his mind right and wrong were sharply defined, and this simplicity of outlook characterised his whole life. Those who got to know him learnt that he was genial and kind and a lover of fun. He was always intensely interested in the gossip of the university and kept himself well informed in medical matters even after he ceased to take an active part in them. He liked the good things of life, but without their frills, and though he was well off money meant nothing to him. He was a strong Canadian and maintained that the future cultural life of Canada should lie in affinity with Great Britain and Europe; it was this feeling that guided him to some extent in his choice of friends, for he chose them from among those who were contributing something to Canadian culture. Though he has made a name for himself as a teacher, for his deep historical sense and ready wit gave life to his lectures, it will be his skill as a writer and staunch personality that will chiefly be remembered.

WILLIAM FLETCHER, M.D. Camb., F.R.C.P.

Dr. Fletcher, who died at Bedford on Sept. 18th, was born in 1874, the son of the Rev. John Price Fletcher of Burbage, Leicestershire. He entered Caius College, Cambridge, in 1890, took honours in the natural sciences tripos, and obtained a scholarship at St. Mary's Hospital, Paddington, qualifying there in 1896. After a resident appointment at the Metropolitan Hospital he went into general practice at Coventry. This failed to satisfy his bent and in 1903 he joined the Government medical service in Malaya, where he was first medical officer to the General Hospital, Kuala Lumpur, and five years later was appointed pathologist to the Institute of Medical Research. Here he worked with Daniels, Henry Fraser, and Stanton, and finally succeeded the last named as director. He was a good technician and his sound mathematical training enabled him to get the best out of staff and apparatus. His output at this time was considerable, beginning with an essay (with Dr. Doris Mackinnon) on rice and beri-beri, for which he was awarded the Craggs prize, and going on to tsutsugamushi fever, tropical typhus, and melioidosis. In our own columns he wrote on the lepra bacillus, on the luetin reaction in syphilis, and on the Wassermann reaction in malaria. He investigated the efficacy of cinchona febrifuge and tried to demolish the notion of a quinine-resistant form of malaria. He remained in Malaya for twenty years, excepting for a period of war service as pathologist at the University War Hospital, Southampton, with rank as temporary captain. Here he studied the mucoid forms of paratyphoid and dysentery bacilli. After the war he was impressed with the continuing danger of dysentery (especially Flexner) carriers and devised methods for their detection and possible segregation. On leaving Malaya he settled in London, where he was appointed a member of the Colonial Advisory Medical Committee, and was for a time secretary of the Colonial Medical Research Committee. He took an active part in the Royal Society of Tropical Medicine of which he became a vice-president.

A colleague and friend of thirty years' standing writes: "Fletcher was a first-class clinician, and I always felt that the laboratory's gain was very much the ward's loss. He was extraordinarily careful and thorough in all his work and was self-critical almost to a fault, though unstinting in his generous appreciation of the work of others. He was immensely popular with his patients of all nationalities in Malaya and his passing will be deeply regretted there. Fletcher was a man whose chief hobby was his work. At Cambridge he rowed in his College boat, and in Malaya he used to play tennis and occasionally get some shooting, but these were mere interludes. After his return to England his health was none too good, though he always made light of his illnesses. For a fortnight he had anginal pain and then a coronary thrombosis proved fatal—an end strangely similar to that of his friend and colleague Stanton a few months earlier."

Dr. Fletcher married in 1915 Mary Beatrice Hillman; his widow is left with a son and a daughter.

MEDICAL NEWS

University of London

Dr. Phyllis Tookey Kerridge will give four lectures on the physiology of hearing and speech on Mondays from Oct. 10th to 31st, and Dr. R. J. Lythgoe five lectures on the physiology of vision on Tuesdays and Thursdays from Oct. 13th to 27th. All these lectures will be held at University College, Gower-street, W.C., at 5 P.M. Other lectures to be given at the College during the term include: Miss L. Margaret Kerly, Ph.D., on muscle chemistry (Nov. 15th at 5 P.M.) and Prof. Jacques Errera on intermolecular forces and infra-red spectroscopy (Nov. 28th at 5.30 P.M.).

Prof. C. Heymans, who holds the chair of pharmacology in the University of Ghent, will lecture on some aspects of blood-pressure regulation and experimental arterial hypertension on Friday, Oct. 14th, at 5.30 P.M., at King's College, Strand. Admission will be free without ticket.

The University Library, formerly at South Kensington, has been removed to its new building at Bloomsbury. In future all communications should be addressed to the Goldsmiths' Librarian, University of London Library, Bloomsbury, W.C.1.

Royal Free Hospital

An A. M. Bird post-graduate scholarship in pathology has been awarded to Dr. N. F. T. Crowley, and a Mabel Webb and A. M. Bird research scholarship to Dr. M. V. Sudds.

St. John Clinic and Institute of Physical Medicine

A course of practical lecture-demonstrations on the rheumatic diseases will be held at the clinic, Ranelagh-road, London, S.W., on Fridays, at 3.30 P.M., from Oct. 28th to Dec. 16th. The inaugural lecture will be given by Prof. F. R. Fraser, who will give a general survey of the rheumatic problem. Details of the lectures will be announced weekly in our Medical Diary, and a further course will be held in the spring. Both courses are open to all members of the medical profession.

University of Leeds

At recent examinations the following candidates were successful :—

M.D.

Eugenie C. Illingworth and N. Wood.

FINAL EXAMINATION FOR M.B., CH.B.

Part I.—N. K. Barber, F. Debney, R. G. Denniss, P. A. Dobb, J. H. Foxton, A. Greenwood, A. Markey, A. Percival, I. G. W. Pickering, Helen M. Secker, W. Sheffield, Beatrice F. Stephenson, P. H. Tordoff, T. R. Wilson, and D. S. Young.

Part II.—J. R. Acfield, T. E. Broadbent, D. Brook, A. B. Dick, A. F. A. Fairweather, H. T. Hardy, D. G. Huntly, E. Hyman, D. J. McCandlish, Marjorie Marquis, Kathleen V. Miller, J. Overton, C. T. Roberts, C. R. Robson, Dorothy E. Rowling, J. F. Scannell, J. L. Sharp, A. H. Snalam, I. S. Stewart, C. L. Summerfield, A. W. Taylor, J. P. Watson, and K. B. Wood.

Part III.—J. R. Acfield, T. E. Broadbent, D. Brook, A. B. Dick, A. F. A. Fairweather, H. T. Hardy, D. G. Huntly, E. Hyman, D. J. McCandlish, Marjorie Marquis, Kathleen V. Miller, J. Overton, C. T. Roberts, C. R. Robson, Dorothy E. Rowling, J. L. Sharp, A. H. Snalam, I. S. Stewart, C. L. Summerfield, A. W. Taylor, J. P. Watson, and K. B. Wood.

B.CH.D.

J. Dawson (second-class honours) and A. R. Henwood.

L.D.S.

S. Benedict, C. G. Boothroyd, W. H. Dyke, N. L. Hill, B. S. E. Roux, and F. A. Wilson.

D.P.H.

R. G. Smithson, E. H. Tomlin, and Marjorie M. Wilson.

The West Riding panel practitioners' prize and the William Hey gold medal was awarded to W. M. H. Shaw.

Cancellations

Charing Cross Hospital.—The prize-giving on Sept. 30th at which Lord Stamp was speaking, the dinner on Oct. 1st, and the post-graduate course have been cancelled.

St. George's Hospital.—The post-graduate course for students of this hospital will not be held this week-end, and Mr. Harold Barwell will not deliver the inaugural address on Sept. 30th. The dinner on Oct. 1st has been cancelled.

St. Mary's Hospital.—The week-end post-graduate course which was to have begun yesterday (Thursday) has been cancelled. The dinner, which was arranged for Saturday, Oct. 1st, will not be held.

St. Thomas's Hospital.—The old students' dinner to be held on Oct. 7th has been cancelled.

Chartered Society of Massage and Medical Gymnastics

The bond between four great professions associated in a common task was the serious theme of the speeches at the annual dinner of the society held on Sept. 21st at the Café Royal, W. Lighter variations on this theme were played with skill by hosts and by guests representing medicine, nursing, and the church—though the latter, in the person of the Rev. W. P. G. McCormick, reserved exposition of the relation between spiritual and material contributions to healing for the special service arranged for members of the congress at St. Martin-in-the-Fields. Surgeon Vice-Admiral P. T. Nicholls spoke as a patient and an administrator, as well as from experience in naval hospitals, of the debt owed by medicine to members of the Chartered Society. Miss H. S. Angove, in responding to his toast of the Society, recalled its changes of name and habitat since its foundation in 1894. She traced its migration from modest quarters near the Strand northwards and eastward, always outgrowing the accommodation available, to settle at last as tenants of its good friends the British Medical Association in palatial offices at Tavistock House North. Over 11,000 men and women attached to 32 branches throughout the British Isles were ready for any service that might be required of them. Miss M. Randell's welcome to the guests, full of subtle allusion, was appreciated no less than Miss E. M. Musson's neat response. Mr. R. C. Elmslie confirmed Miss Musson's recollection of the porter and the kindly sewing-woman who in their spare time constituted the whole of the massage department of St. Bartholomew's Hospital until Dr. Justina Wilson began her pioneer work there. As former chairman of the society Mr. Elmslie congratulated his successor, Dr. James Mennell, on the progress it had made under his guidance. In response Dr. Mennell noted that the financial position of the society had not kept pace with its growth, but that the contemplated increase in the registration fee from three to five guineas would restore its credit balance. He announced that his impending retirement from the chair would in no way diminish his interest in the society or his intention to continue to serve it in every possible way.

ADVICE TO DOCTORS AND NURSES

THE Ministry of Health is receiving inquiries from doctors and nurses asking what they would be expected to do in the event of hostilities. Some already have commitments to the Forces or to the A.R.P. or other public services. Those who are not committed in this way but are attached to hospitals would no doubt be required there, and should in any case keep in touch with their hospitals. Doctors and nurses in private practice may be able to afford valuable assistance in connexion with local air-raid precautions schemes, and if they are willing to help in this way they should get into touch with the medical officer of health. They may also be required for treating casualties in their own homes.

The British Medical Association at the request of the Government has compiled a register of doctors who are prepared to serve in various capacities and use will be made of this register for importing doctors into a district where there is urgent need of additional medical assistance. Any doctor who has not yet responded to the inquiries from the British Medical Association should do so without delay, and if he does so he will, when need arises, be told where and in what capacity his services are required.

Pending the establishment of similar machinery for the nursing profession, any nurses who are willing to offer their services but are not in touch with hospitals should enrol with the local branch or head office of the College of Nursing, whether they are members or not. This applies only to State-registered or certificated nurses, including those who have given up practice.

There is no need for doctors or nurses to offer their services directly to the Ministry.

Medical Diary

Oct. 3rd to Oct. 8th

SOCIETIES

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

TUESDAY.

Orthopædics.—5.30 P.M. (Cases at 4.30 P.M.) Mr. J. S. Batchelor: (1) Occupational Osteo-arthritis of Carpo-metacarpal Joints. (2) Coxa Vara. Mr. R. Brooke: (3) Osteochondritis of Ischiopubic Ramus. (4) Modification of the Atkinson Range Finder. Mr. Philip Wiles: (5) Multiple Osteochondromata.

WEST LONDON MEDICO-CHIRURGICAL SOCIETY.

FRIDAY.—8.30 P.M. (De Vere Hotel, Kensington), Dr. Maurice Shaw: Heredity and Medicine. (Presidential address.)

BIOCHEMICAL SOCIETY.

SATURDAY.—2.45 P.M. (Biochemical Laboratory, Cambridge), short communications.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

UNIVERSITY COLLEGE HOSPITAL, W.C.

THURSDAY.—10 A.M., Mr. F. J. F. Barrington: Kidney Growths. 10.45 A.M., Mr. Harold Kisch: ear, nose, and throat demonstration. 11.30 A.M., Mr. Julian Taylor: The Surgical Treatment of Pain. 12.15 P.M., Dr. R. H. Dobbs: The Medical Treatment of Pyloric Stenosis. 2 P.M., Dr. F. M. R. Walshe: Some Problems in Poliomyelitis. 2.45 P.M., Mr. Humphrey Neame: Iritis and

Glaucoma. 3.15 P.M., Prof. F. J. Browne: Toxæmias of Pregnancy. 4 P.M., Mrs. M. Boycott: Clinical Use of Female Sex Hormones.

FRIDAY.—10 A.M., Dr. A. M. H. Gray: Pyococcal Infections of the Skin. 10.45 A.M., Dr. J. C. Hawksley: Diagnosis and Treatment of Common Disorders of the Blood. 11.30 A.M., Mr. Myles Formby: Modern Hearing-aids in the alleviation of Chronic Deafness. 12.15 P.M., Dr. C. W. Morris: Some Anæsthetic Emergencies. 2.15 P.M., Dr. Andrew Morland: The Detection of Early Tuberculosis. 2.40 P.M., Dr. H. P. Himsworth: Tuberculosis in Diabetics. 3.30 P.M., Prof. R. S. Pilcher: Cancer of the Lung.

Open only to former students of the hospital.

NATIONAL HOSPITAL FOR DISEASES OF THE HEART, Westmoreland-street, W.

MONDAY.—10 A.M., Dr. B. T. Parsons-Smith: The Anatomy and Physiology of the Circulation. 11.15 A.M., Dr. T. F. Cotton: Symptomatology.

TUESDAY.—10 A.M., Dr. J. M. H. Campbell: Heart Disease in Children. 11.15 A.M., Dr. John Parkinson: Physical Signs.

WEDNESDAY.—10 A.M., Dr. D. Evan Bedford: X Ray Examination in Cardiovascular Disease (I). 11.15 P.M., Dr. Paul Wood: Diseases of the Aortic Valve. 2 P.M., Dr. Skene Keith: pathological demonstration.

THURSDAY.—10 A.M., Dr. Campbell: The Heart in Thyrotoxicosis. 11.15 A.M., Dr. Parkinson: Clinical Electrocardiography (I).

FRIDAY.—10 A.M., Dr. Parsons-Smith: Arterial Disease and Blood Pressure.

Ward rounds daily at 2 P.M. (except Wednesday), and out-patients at 3 P.M.

BRITISH POSTGRADUATE MEDICAL SCHOOL, Ducane-road, W.

TUESDAY.—4.30 P.M., Dr. C. W. Buckley: Arthritis.

WEDNESDAY.—Noon, clinical and pathological conference (medical). 3 P.M., clinical and pathological conference (surgical).

THURSDAY.—2.15 P.M., Dr. Duncan White: radiological demonstration.

FRIDAY.—2 P.M., clinical and pathological conference (obstetrics and gynæcology).

Daily 10 A.M. to 4 P.M., medical clinics, surgical clinics and operations, obstetrical and gynæcological clinics and operations.

LONDON SCHOOL OF DERMATOLOGY, 5, Lisle-street.

TUESDAY.—5 P.M., Dr. W. Griffith: Eczema.

THURSDAY.—5 P.M., Dr. M. S. Thomson: Animal Diseases Communicable to Man.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, W.C.

THURSDAY.—2 P.M., Dr. E. A. Cockayne: General Diseases of Bone. 3 P.M., Dr. D. N. Nabarro: Treatment of and Prognosis in Congenital Syphilis.

Out-patient clinics daily at 10 A.M., and ward visits at 2 P.M.

CENTRAL LONDON THROAT, NOSE, AND EAR HOSPITAL, Gray's Inn-road, W.C.

MONDAY to SATURDAY.—First week of course in anatomy and physiology for Part I of the D.L.O. examination.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.

MONDAY to SATURDAY.—NATIONAL HOSPITAL FOR DISEASES OF THE HEART, Westmoreland-street, W. All-day course in cardiology (open to non-members).—METROPOLITAN HOSPITAL, Kingsland-road, E. All-day course in medicine, surgery, and the specialties.—ST. JOHN'S HOSPITAL, 5, Lisle-street, W.C., afternoon course in dermatology (open to non-members).—WEST END HOSPITAL FOR NERVOUS DISEASES, Welbeck-street, W. D.P.M. course in neurology.—PRESTON HALL, near Maidstone, Kent. Saturday, M.R.C.P. demonstration on pulmonary tuberculosis.—PHYSIOLOGY LECTURES FOR PRIMARY F.R.C.S. Mon., Wed., and Fri., 5.30 P.M.

MANCHESTER ROYAL INFIRMARY.

FRIDAY.—4.15 P.M., Mr. J Phillip Buckley: surgical cases.

UNIVERSITY OF GLASGOW.

TUESDAY.—4.30 P.M. (Tennent Memorial Building, Church-street), Dr. I. Chesar Michaelson: Glaucoma.

Vacancies

For further information refer to the advertisement columns

Ashton-under-Lyne, Lake Hosp.—Res. Obstet. Officer, £350.

Ashton-under-Lyne, Lake Hosp. and Darnton House.—Jun. Res. M.O., at rate of £225.

Beckenham, Bethlem Royal Hosp., Monks Orchard.—Two Res. H.P.'s, each at rate of £175.

Belgrave Hosp. for Children, 1, *Clapham-road, S.W.*—Two H.P.'s and H.S., each at rate of £100.

Birkenhead Municipal Hosp.—Sen. Res. M.O., £350.

Birmingham and Midland Eye Hosp.—H.S., at rate of £130.

Birmingham United Hosp.—Asst. Bacteriologist, £350.

British Postgraduate Medical School, Ducane-road, W.—Asst. in Morbid Anatomy in Dept. of Pathology, £300.

British Red Cross Society Clinic for Rheumatism, Marylebone-road, W.—Hon. Dermatologist. Also Hon. Neurologist.

Bushey Heath, Herts, Middlesex County Council Maternity Hosp.—Res. Asst. M.O., £400.

Calcutta, All-India Institute of Hygiene, &c.—Prof. of Malariology and Prof. of Vital Statistics, &c., each Rs. 1200 monthly.

Chester Royal Infirmary.—H.P. and H.S., each £150.

Croydon County Borough.—Asst. M.O.H., Public Health Department, £400.

Dartford, County Hosp.—Res. Asst. M.O., £250.

Dorchester, Dorset County Hosp.—H.S., at rate of £150.

Dreadnought Hosp., Greenwich, S.E.—Med. Supt., £250.

Dundee Mental Hosp., Westgreen.—Asst. M.O., £300.

Durham County Council.—Two Asst. School M.O.'s, each £500.

Ealing, King Edward Memorial Hosp.—Cons. Physician for Diseases of Children.

Eastbourne, Princess Alice Memorial Hosp.—Hon. Asst. Ophth. Surgeon.

Eastbourne, Royal Eye Hosp., Pevensey-road.—H.S., at rate of £100.

Edinburgh, Royal College of Surgeons.—Conservator of the Museum, &c., £1000.

Enfield Education Committee.—School Dental Surgeon, £500.

G.P.O.—Asst. M.O. in Headquarters Medical Branch, £500.

Greenwich Metropolitan Borough.—Jun. Asst. Maternity and Child Welfare Officer, £500.

Halifax General Hosp.—Two Jun. Res. M.O.'s, each £250.

Hereford, Herefordshire General Hosp.—H.S. to Special Depts., £100.

Hosp. for Consumption and Diseases of the Chest, Brompton, S.W.—Res. Surg. O., £150; Asst. Res. M.O., at rate of £150. Also three H.P.'s, and H.P. for Frimley Sanatorium, each at rate of £50.

Ilford, King George Hosp.—Hon. Surgeon. Also H.S., at rate of £100.

Imperial Chemical Industries Ltd.—Asst. M.O., £600.

Infants Hosp., Vincent-square, Westminster, S.W.—Hon. Anæsthetist.

Kent County Council.—Sen. Res. Asst. M.O., £350.

Leeds City.—Asst. Clin. Tuberculosis Officer, £500–£600.

Leeds General Infirmary.—Hon. Asst. Surgeon.

Liverpool Heart Hosp.—Hon. Asst. Physician.

London Chest Hosp., Victoria Park, E.—Asst. Surgeon.

London County Council.—Asst. M.O.'s, Grade II, each £250.

London Hosp., E.—Surg. First Asst. and Reg., £300. Also Clin. Asst. in X Ray Dept., £100.

Manchester, Ancoats Hosp.—Radiological Officer, £400. Also Surg. Reg., £50.

Manchester, Monsall Hosp. for Infectious Diseases.—Second Res. Asst. M.O., £350.

Manchester, Northern Hosp.—Res. Surg. O., at rate of £200.

Manchester, Park Hosp., Davyhulme.—Asst. Res. M.O.'s, at rate of £300.

Manchester, Royal Children's Hosp.—Sen. M.O., £300.

Manchester, St. Mary's Hospe.—Registrar to Gynæcological Out-patients' Dept., 1 guinea per session.

Metropolitan Hosp., E.—Surg. Reg.

Middlesbrough Education Committee.—Sen. Asst. M.O., £500.

Middlesex Hosp., W.—Anæsthetist, £300.

National Hosp., Queen-square, W.C.—Asst. Reg., £200. Also Res. M.O., £150.

National Hosp. for Diseases of the Heart, Westmoreland-street, W.—Res. M.O. and Out-patient M.O., at rate of £150 and £125 respectively.

Newport, Mon, Royal Gwent Hosp.—Sen. H.S., £250. Cas. O. and H.P., each at rate of £150. Also Second, Third, and H.S. to Fracture and Orthopædic Dept., each at rate of £135.

Paddington Green Children's Hosp., W.—H.P. and H.S., each at rate of £150.

Penshurst, Cassel Hosp. for Functional Nervous Disorders, Swaylands.—Res. M.O., £400.

Portsmouth City.—A.R.P. M.O. and Asst. M.O.H., £500.

Queen Mary's Hosp. for the East End, E.—Hon. Surgeon.

Queen's Hosp. for Children, Hackney-road, E.—Ear, Nose, and Throat Surgeon.

Redhill, Surrey, Royal Earlswood Institution.—Jun. Asst. M.O., at rate of £250.

Rochester, St. Bartholomew's Hosp.—H.S. and H.P., each at rate of £150.

Romford, Oldchurch County Hosp.—Two Jun. Res. M.O.'s, each £250.

Rotherham.—Asst. Res. M.O., £350.

Rotherham, Oakwood Hall Sanatorium.—Tuber. Officer, &c., £750.

Royal Air Force.—Commissions.

Royal National Orthopædic Hosp., 234, *Great Portland-street, W.*—Three Surg. Registrars, each £105.

Royal Naval Medical Service.—M.O.'s.

Royal Northern Hosp., Holloway, N.—H.P., at rate of £70.

St. Albans and Mid-Herts Hosp., Church-crescent.—Res. M.O., £150.

Sheffield Children's Hosp.—H.S., at rate of £100.

Somerset County.—M.O.H. for Urban Districts, £800.

Southend Municipal Hospital, Rochford, Essex.—Res. Deputy Med. Supt., £500.

Swansea General and Eye Hosp.—H.S. and H.P., each at rate of £150. Also Cas. O., at rate of £150–£175.

Tilbury Hosp., Essex.—H.S., at rate of £140.

Wakefield, Wadsley Mental Hosp.—Asst. M.O., £350.

Weir Hosp., Balham-road, S.W.—Sen. Res. M.O., £250.

Wellington, New Zealand, Dept. of Health.—School M.O.'s, £515.

West London Hosp., Hammersmith, W.—Res. Chief Asst. to Dept. for Treatment of Injuries, £200. Hon. Physician to Psychological Medicine. Also Hon. Reg. to Ear, Nose, and Throat Dept.

Willesden General Hosp., Harlesden-road, N.W.—Hon. Clin. Asst.

Wolverhampton, New Cross Hosp.—Asst. M.O., £200.

Worcester County and City Mental Hosp., Powick.—Asst. M.O., £350.

The Chief Inspector of Factories announces vacancies for Examining Factory Surgeons at Lancaster (Lancaster) and Market Harborough (Leicester).

NOTES, COMMENTS, AND ABSTRACTS

THE JUBILEE OF AN INTERNAL CLINIC

LAST month the clinic at Ruthin Castle, formerly situated at Duff House, Banff, completed twenty-five years of service. It was in 1912 that Dr. David Lawson, already well known in connexion with tuberculosis sanatoria, conceived the idea of a sanatorium for gastric diseases and invited Dr. (now Sir) Edmund Spriggs to take charge of it. The scheme came rapidly to fruition and on Sept. 1st, 1913, a clinic at Duff House was opened with Dr. Spriggs as senior physician, Mr. A. J. Leigh, B.Sc., in charge of the laboratories, and Mr. T. A. Watson as secretary. A few days later Miss Dewar joined the staff as matron. What was then a new feature in such an institution was the association under one roof of whole-time doctors and trained workers in chemistry, bacteriology, and X rays, a special dietetic staff, and skilled attendants for physical treatment. When a little later the radiologist, Dr. Gompertz, went on war service, his assistant, Mr. O. A. Marxer, took over this department. At the end of ten years the need of easier access for patients from all parts of the country led to the transfer of the clinic to Ruthin Castle, North Wales; and soon after the move in April, 1923, the staff was strengthened by the addition of Dr. S. W. Patterson and Dr. J. H. Anderson. The senior physician, the matron, the secretary, the chief chemist, the clinical biologist, the diet sister, with several of the domestic and outdoor staff, have all been attached to the institution almost from the start. In the 25 years there have been over 12,000 admissions, about a quarter for disorders of the heart and arteries, another quarter for alimentary and nutritional disorders, many suffering from nervous diseases and rheumatism, and a residue of almost every kind of illness except infectious and mental disease. There has been a steady output of research, some hundred papers having been published during the period, not counting addresses by members of the staff to medical societies. The subjects studied have included the treatment of diabetes and pernicious anæmia, gastritis (by strial patterns), disease of the small intestine and pancreas, the diagnosis, pathogenesis, and treatment of diverticulosis and diverticulitis (the radiological and clinical features of which were largely worked out at the clinic), colitis in its many forms, and disseminated sclerosis and its distribution in Wales; and an analysis has been made of the causes of headache and the results of its treatment. The resident physicians have practised throughout as consultants coöperating with the family doctor and other consultants and supplying them with full technical reports of progress. Every member of the medical and scientific staff of the clinic is a salaried officer, without any direct financial interest in the fees paid by any patient. It is proper to record the esteem in which the clinic and its staff has won from the medical profession during its quarter century in two homes.

THE SOCIAL FUNCTION OF PHILANTHROPY

EVEN those who appreciate the influence philanthropic activities have had on the development of social services in this country do not always realise the nature, the extent, and the diversity of that influence. Until recently little had been written on this absorbing subject and information on either facts or principles has been difficult to obtain. Within the last few years, however, some valuable books have appeared, and among them a high place may be accorded to Miss Constance Braithwaite's essay on The Voluntary Citizen,[1] just published. As an economist, a keen student of social services, and a practical social worker, Miss Braithwaite is exceptionally well qualified to write on the subject. Her book is divided into three sections. The first discusses the nature and importance of philanthropic activity: it is an attempt to "evolve a philosophy of philanthropy." The second sets out in a convenient form the available information on the finance of organised charities, and the third is a detailed study of district nursing, which is selected as an example of a social service organised and maintained by voluntary associations. It may seem that with the great extension of state-provided social services in the present century the need for voluntary activities has diminished, but Miss Braithwaite shows this to be a short-sighted view. Each advance reveals the need for further advances. The medical inspection of school-children demonstrated that it was necessary in some way to provide treatment of the defects discovered by inspection, and the work of the care committees opened up new spheres of activity for voluntary workers. When the maternity and child welfare movement began to develop nearly forty years ago, attention was first concentrated on preventing the heavy infant mortality due to defective feeding, but it soon became apparent that this was only part of a highly complex problem; and each extension of the movement has pointed the way to further extensions—one of the latest and most important being child guidance—in which voluntary workers have been prominent among the pioneers. In expansions of municipal activity an increasing tendency may be noticed to supplement the elected members of public bodies by coöpted men and women with special experience in philanthropic work. Miss Braithwaite is right in her contention that the need for such workers has not lessened. Her book merits the attention especially of those doctors and laymen who are striving through the social services to leave the world better than they found it.

[1] The Voluntary Citizen: an Enquiry into the Place of Philanthropy in the Community. By Constance Braithwaite, B.Sc. (Economics), Ph.D., Lecturer in the Social Study Department of the University of Birmingham. London: Methuen and Co. 1938. Pp. 342. 7s. 6d.

A MUNICIPAL BLOOD-TRANSFUSION SERVICE

THE arrangements in progress for the establishment of a municipal blood-transfusion service in Buenos Aires are described by Dr. E. S. Sammartino, who is to be its director.[1] The organisation which he describes is not yet complete, but when it is in full working order it will be possible for any doctor in the city to obtain a transfusion for any of his patients through the public health authority with a minimum of delay and trouble. Necessitous patients will receive blood free of charge; others will be charged a fee. The plan is to organise at each of the principal municipal hospitals a service similar to that which Dr. Sammartino has been running privately for some years at the Hospital Durand. Each centre will serve its own area, and will be staffed by a director (one of the hospital honorary staff), a number of assistants, and a pathologist. The assistants will not only examine donors and take blood for storage or for immediate transfusion to in-patients at the hospitals, but will be available on request to perform transfusions at the patients' homes. A list of suitable donors is drawn up (some voluntary, others paid) after the requisite clinical and pathological examination and particulars of blood group are filed. A reserve of citrated blood is kept in cold storage from which very urgent cases can be supplied, the municipal ambulances carrying the necessary apparatus and, if required, a medical officer, to the patient's home. In addition to whole blood, each centre will keep in stock supplies of convalescent serum, obtained as opportunity arises, from patients in the wards. The chief centre will remain at the Hospital Durand, and will serve to coördinate the work as a whole.

[1] Proyecto de Organizacion y Reglamentacion de la Transfusion de Sangre en la Cindad de Buenos Aires. Buenos Aires Buffarini. 1938.

PSYCHIATRY IN THE ARMY

THIS essay [1] on military psychiatry reviews the German and French literature on the subject and discusses the more obvious and familiar questions so far as they concern an army. The important psychiatric problems of an air force are not considered, nor is there anything about the psychological aspects of the rapid building up of a huge army under the National-Socialist government. There are interesting figures and comments on alcoholism, on disciplinary and medical methods of dealing with psychogenic reactions, and on the greater frequency of suicide in the German army before 1933 (figures since then are not available) as compared with the civil population. It is remarkable that of the admissions to a neuro-psychiatric military hospital as many as 45 per cent. were for psychopathic and neurotic conditions; 12 per cent. of the patients were psychotic or mentally defective, and 28 per cent. were labelled as neurological. Of the psychopathic admissions, however, just on a quarter were for suicidal attempts. The incidental brief descriptions of army life (as in section iii) are somewhat unpalatable; a peace-time volunteer army like this might have few recruits. What psychiatric criteria are applied in the selection of soldiers is not made clear; one cannot discover, for example, how far the feeble-minded are considered unsuitable for military service, nor what methods of testing and diagnosis are employed. The little book as a whole is informative rather than illuminating. Its title is surely ironical: psychiatry's business is to remove the instruments and causes of irrational behaviour, not to serve them.

THE COMMERCE OF DRUGS

THREE months ago we drew attention to the decadence of London as a clearing-house for the world's drugs, exemplified by the poor response of buyers at the public auctions periodically held in Mincing-lane. At an auction last week only three catalogues were presented, and only one lot was sold, consisting of a single bale of Buchu leaves. The demand is so small that it seems unlikely that these auctions will be held much longer in their present form. Their discontinuance would not mean that the consumption of vegetable drugs in Great Britain has diminished during the last 20 years, but that London has lost much of its former oversea trade in drugs and that buyers at home prefer to negotiate their business by private treaty rather than in the auction room.

TREATMENT OF EXHIBITIONISM

CASTRATION for exhibitionists and others with perverse sexual behaviour is put forward by its advocates as therapeutic rather than as a merely preventive or punitive measure. Prof. A. Jentzen, of Geneva, reports [2] seven cases in which bilateral castration has apparently put an end to the patients' exhibitionism, at any rate for the three years that have elapsed since the operation. He describes their state of contentment after the operation and notes that they even express resentment towards the judge who did not advise them to have this beneficent operation at the time of their first offence of the kind; and he adds in his enthusiasm that the "inconvénients" due to castration do not seem to be great: "sexual desire and the physical impulse are replaced by a quasi-maternal emotional desire," the patients' physical powers are increased, they work with pleasure, their character improves, they are no longer choleric but gentle and reasonable, and have "un esprit de famille développé." A tendency to fatness and an impairment of memory in some cases are indeed the only drawbacks he mentions to this recipe for turning men into angels. Prof. Jentzen refers to the laws providing compulsory castration for sexual offences in Germany and some other countries, and would subscribe to this, provided that extreme caution is exercised and a regular procedure followed, including careful examination of the case by a committee of doctors and jurists. There can be no doubt that any such measure would be repugnant to English habits of feeling, and that the therapeutic value of castration for exhibitionism has not by any means been established as yet. It is nevertheless of interest that in Capetown recently a sexual recidivist is said [3] to have volunteered to undergo castration, and that the court accordingly postponed sentence.

[1] Die Psychiatrie im Dienste der Wehrmacht. By Adolf Heidenhain. Leipzig: Georg Thieme. 1938. Pp. 53. RM.2.80.
[2] *Schweiz. med. Wschr.* 1938, No. 18, p. 476.

JEWISH DOCTORS IN BERLIN

THE *Münchener Medizinische Wochenschrift* of Sept. 9th states that the edict excluding Jewish doctors from practice will result in Berlin in a loss of 22·5 per cent. from the list of practising doctors and of 27·4 per cent. from the list of insurance practitioners. It is added that in Berlin, where the Jewish population at present amounts to 200,000, an adequate number of Jewish doctors will be allowed to practise among their kinsmen.

[3] *Brit. med. J.* Sept. 17th, 1938, p. 644.

Appointments

BINGHAM, J. A. W., M.B. Belf., F.R.C.S., Resident Surgical Officer at King Edward VII Hospital, Windsor.

CHESTER, A. W., M.B. Durh., Senior Resident Medical Officer at the City of London Maternity Hospital.

MAHER, J. P., L.R.C.P.I., D.P.H., Resident Assistant Medical Officer at Romsley Hill Sanatorium, Halesowen.

SMITH, S. F., M.B. Lond., First Assistant Medical Officer at the Epsom County Hospital.

WILKIE, J. L., M.B. Edin., F.R.C.S.E., Hon. Ophthalmic Surgeon to the Hospital for Sick Children, Newcastle-on-Tyne.

WOOLSTONE, A., M.R.C.S., Junior Resident Medical Officer at the City of London Maternity Hospital.

Examining Surgeon under the Factories Act, 1937: Dr. I. M. HUGHES (Bacup District, Lancashire).

Medical Inspectors of Factories: TUDOR E. HOWELL, M.R.C.S., RICHARD S. F. SCHILLING, M.R.C.S., and ALEXANDER T. DOIG, M.D.

Births, Marriages, and Deaths

BIRTHS

BURSTAL.—On Sept. 17th, the wife of Dr. E. Worsley Burstal, of Lutterworth—a daughter.

PHILLIPPS.—On Sept. 23rd, at Banbury, the wife of Dr. W. H. Phillipps—a daughter.

STEELE-PERKINS.—On Sept. 18th, at Hong-Kong, the wife of Surg.-Lieut. J. L. S. Steele-Perkins, R.N.—a daughter.

TROWELL.—On Sept. 22nd, at Colinton, Edinburgh, the wife of Dr. O. A. Trowell—a son.

WELCH.—On Sept. 25th, at Bedford, the wife of Dr. Cuthbert G. Welch—a daughter.

MARRIAGES

BOND—GOODSON.—On Sept. 24th, at St. Peter's-in-Thanet, Dr. Cecil Harold Thomas Bond, to Marjorie Jean Minter Goodson.

NEAME—MONROE.—On Sept. 23rd, at St. Mary's Church, Wimbledon, Humphrey Neame, F.R.C.S., to Elizabeth Monroe.

DEATHS

CRIMP.—On Sept. 24th, at Bryanston-street, W., George Lydston Crimp, M.B. Camb.

EVERINGTON.—On Sept. 23rd, in a motor accident, Herbert Devas Everington, M.B. Lond., of Sanderstead, Surrey.

FLETCHER.—On Sept. 18th, at Bedford, William Fletcher, M.D. Camb., F.R.C.P., of Kensington Park-gardens, London.

HALL.—On Sept. 25th, at Worthing, Gilbert Capel Hall, M.R.C.S., Capt., I.M.S. (retd.).

HOWARD.—On Sept. 24th, Arthur Walters Howard, M.R.C.S., of Hove.

WOOD.—On Sept. 26th, at Iffley, Oxford, Cyril George Russ Wood, O.B.E., F.R.C.S. (formerly of Shrewsbury).

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.